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NORTH CAROLINA MEDICAL JOURNAL

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VOLUME 8 JANUARY, 1947 NUMBER 1

# PROBLEMS OF BILIARY TRACT SURGERY

I. S. RAVDIN, M.D.*
PHILADELPHIA

The recent developments in thoracic and cardiac surgery and in surgery of the vascular and sympathetic nervous systems have given new hope to sufferers from a wide variety of previously irremediable disorders. It is fortunate that, while these new fields of surgery were being developed, a sustained interest has been maintained in the older fields of gastro-intestinal and biliary tract surgery. The surgical problems of these systems are not yet solved, and in certain of them only a beginning has been made. I shall confine my remarks this evening to the liver and the extrahepatic biliary passages, for disease of this system is a frequent cause of hospitalization, and, all too often, of death.

## *The Liver and Its Functions*

The liver is the largest single organ of the body. It has two blood supplies—the arterial, supplying approximately 20 per cent of the blood coming to the liver, and the venous, accounting for the remaining 80 per cent. Death occurs when either of these vascular supplies to the liver is suddenly terminated. Death also occurs following total hepatectomy, whether this occurs in the anatomic sense or the physiologic sense. No other important organ, however, possesses the same ability to restore itself histologically and functionally following severe disease or injury. It is all the more remarkable that anatomic and functional restoration frequently takes place under circumstances which are far from ideal.

The known functions of the liver are manifold, and as our knowledge of intermediary metabolism increases our respect for this organ must become deeper, for no other organ has such a diversity of functions. I shall not attempt to review them, for they range from food utilization and storage to the synthesis of a variety of materials which play an important role in digestion, in coagulation, in tissue regeneration, and in homeostasis.

It is now agreed by nearly all workers interested in the liver that it can be protected against many noxious agents by an adequate diet, and that restoration of normal function following impairment can be greatly facilitated by a diet containing large amounts of carbohydrate and protein and a minimum of fat.

Within recent years important advances have been made in developing tests of specific functions of the liver, but in many instances the extent of the functional impairment cannot be estimated until numerous tests have been made. The most sensitive indicator of impaired hepatic function is the change which takes place in bile salt synthesis, but as yet we cannot make use of this test in the patient who does not have a tube in the common bile duct. We can, however, determine serious hepatic dysfunction, for this nearly always produces hypoprothrombinemia; and when the administration of vitamin K fails to result in a normal or nearly normal prothrombin time, we may conclude that the liver is on the verge of general incompetency.

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One of the Matheson Foundation Medical Lectures, delivered at Charlotte, October 31, 1946.

* John Rhea Barton Professor of Surgery, University of Pennsylvania; Surgeon in Chief, Hospital of the University of Pennsylvania; Director, Harrison Department of Surgical Research.

### *Anatomic Variations in the Extrahepatic Bile Passages*

In the attempt to prepare our graduates better to utilize the expanding knowledge of normal and abnormal function, we as clinical teachers have placed less and less emphasis on the foundation stones upon which surgery was founded. In order to apply successfully the results of physiologic and biochemical investigations to the problems of his patient, the embryo practitioner must become thoroughly grounded in these sciences. A continuing intimate knowledge of anatomy and pathology is, however, all the more necessary in the training of the modern surgeon; for not only must he recognize the character of gross changes in tissues, but he must be familiar with the variations from the normal anatomic arrangement which so frequently occur in man.

The most accomplished abdominal surgeon will at times injure the common or right hepatic duct; the inexperienced or careless operator will do this far too often. Adequate exposure, knowledge of the general types of ductal abnormalities, and visualization, by careful dissection, of the cystic duct and of any accessory or abnormally placed ducts are necessary if subsequent calamities are to be kept to a minimum. Strictures of the bile passages may result from infection, but this occurrence is rare. They are more often the result of clamping and dividing ducts which have not been carefully identified.

Injuries to the vascular supply may not in themselves be serious unless the main hepatic artery is ligated, but an effort to control hemorrhage caused by unrecognized vascular abnormalities may result in serious damage to the major ductal system.

### *Diagnosis of Biliary Tract Disease*

The diagnosis of uncomplicated gallstone disease is, as a rule, not difficult. A history of indigestion, flatulence, discomfort in the upper abdomen after eating, and intolerance to fatty foods, especially when all or some of these symptoms are associated with nocturnal attacks of upper abdominal pain, is sufficient for the presumptive diagnosis of gallstone disease, regardless of the report on the cholecystographic study or the results of transduodenal gallbladder drainage.

The great value of a cholecystogram positive for calculi is the effect it has in convincing the patient that stones are present and that an operation is necessary. The finding of a fine golden pigment and cholesterol crystals in the sediment of a well centrifuged specimen of gallbladder bile is, in my opinion, the best laboratory indication of the presence of calculi.

The differential diagnosis of jaundice, however, is not always easy. A history suggestive of biliary calculous disease must not be taken as more than presumptive evidence that a stone obstructs the common bile duct. The increasing frequency of infectious hepatitis and of homologous serum jaundice often adds to our diagnostic difficulties. The surgeon is too apt to look upon jaundice which persists for more than two weeks as an indication for surgery, and the internist, aware of the increased incidence of nonsurgical jaundice, may overlook the fact that obstruction by a stone can occur without significant pain or cholangitis.

It is in the borderline cases that carefully performed tests to determine the degree of hepatocellular injury are of considerable value. Even when such tests are skilfully performed, however, the results must be considered together with the clinical history and the clinical course of the disease. Phosphatase determinations, cephalin flocculation and thymol turbidity tests are useful and helpful, but are in themselves not absolutely indicative of the degree of hepatic parenchymal injury. Too great reliance must not be placed upon any single test. It is in the aggregate that liver function tests become diagnostic.

We have long considered that it was dangerous to administer sodium tetraiodophenolphthalein or its isomer for cholecystographic study in the presence of jaundice, for if the dye should be forced into the pancreatic ducts by a stone impacted in the lower end of the common duct an acute pancreatitis might result. Recent studies by Howard(1) show that Priodax, a new agent for cholecystographic study, does not cause pancreatic inflammation. We have repeatedly used this agent for cholecystographic studies in jaundiced patients without the slightest untoward result.

1. Howard, J.: Experimental Studies on the Toxicity of Beta (4-hydrosy-3, 5 diiodophenul)-alpha-phenyl propionic acid (Priodax), to be published.

### *Indications for Operation*

#### *Operation in the presence of minor symptoms*

The question has repeatedly been raised as to whether patients found to have gallstones, but apparently suffering no effects from them, should be advised to have an operation. I say *"apparently* suffering no effects" advisedly, for in my experience the symptomless gallstone is rare. A very careful history will usually disclose what one finds upon careful questioning of the patient with a so-called symptomless duodenal ulcer—that, while the symptoms may have been quiescent for some time, they have occurred in the past. The symptoms of cholecystic disturbances may have been so slight that they were attributed to indiscretions of diet, or to hyperacidity, pylorospasm, or even a neurosis. The attacks may have been so infrequent as to have been practically forgotten. It is not at all unusual for a single typical attack of gallstone colic to be followed by a long period, even years, of freedom from major symptoms.

I do not believe that every patient found to have gallstones should be subjected to operation, but I would like to remind you that delay carries with it definite risks which the physician and the patient must recognize. The longer the calculous disease persists the more extensive is the pathologic change in the gallbladder and the liver, and the greater is the risk of hydrops or empyema, of common duct obstruction and cholangitis, and of malignant disease. Even if none of these conditions supervenes, it is well recognized that the older the patient the greater is the risk even of a simple cholecystectomy.

#### *Acute cystic duct obstruction*

I do not believe that any hard and fast rule can be laid down in regard to operation for acute cholecystitis with cholelithiasis. There are some who say that immediate operation is indicated, while others advocate palliation until the acute symptoms have subsided. Each patient presents an individual problem.

There is no fundamental difference between a stone impacted in the cystic duct or the neck of the gallbladder and a fecalith obstructing the base of the appendix, except that in its usual position the cystic artery is more protected from obstruction, and gangrene and perforation of the gallbladder are not so apt to occur. The observations of van Zwalenburg(2) on obstruction as the major factor in acute inflammation and perforation apply equally to the gallbladder containing calculi and the appendix containing a fecalith.

The lack of unanimity in the literature on the subject of early operation for acute cystic duct obstruction is due to different conceptions of what an early operation is, to differences in the type of operation done under varying circumstances, and to numerous other factors. It should be pointed out that if cholecystectomy is performed on these patients, one must either operate as soon as the symptoms of obstruction begin, or attempt cholecystectomy without visualizing the junction of the cystic and common ducts. The brawny edema so frequently encountered in this area often makes visualization impossible.

If the patient is seen more than twenty-four hours after the onset of symptoms, I delay operation, if possible, until the symptoms subside. If increasing fever, leukocytosis, tenderness, and rigidity make operation mandatory, I frequently do a cholecystostomy as the operation of necessity. Since cholecystostomy is usually reserved for the most advanced cases, the mortality is naturally highest in this group. However, if cholecystectomy were performed on patients so sick, the mortality would probably be even higher. The responsibility of the surgeon is to save the life of the patient. Too often he will fail in this responsibility if he binds himself to a single school of thought or a single operative procedure.

#### *Non-calculous disease*

In spite of a careful history and physical examination and supporting laboratory data, some patients who are thought to have stones will be found at operation not to have them. The surgeon is confronted with the dilemma of removing the gallbladder or doing nothing, and all too frequently a blue, thin-walled gallbladder is excised. The unfortunate outcome is that the patient is not relieved of the symptoms which brought him or her to the surgeon, and at times these are made worse by the operation. The evidence now available is sufficient to support the statement that there is rarely good reason for removing a non-calculous gall-

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2. Van Zwalenburg, C.: The Relation of Mechanical Distention to the Etiology of Appendicitis, Ann. Surg. 41: 437-450, 1905.

bladder. Even the gallbladder of cholesterosis is, in my opinion, not a surgical lesion.

## *Operation*

### *Anesthesia*

The choice of anesthesia in biliary tract surgery is important. Good relaxation must be obtained so as to provide for adequate exposure. Everyone is familiar with the necrotizing effects of chloroform anesthesia, but few realize that an attempt to provide deep relaxation with ethyl ether, nitrous oxide and oxygen, or even ethylene seriously affects bile secretion and bile salt synthesis. Cyclopropane administered with 75 per cent oxygen is, as far as can be determined, without effect on the hepatic parenchyma. The use of substances having a curare-like effect, which are now available, assists in providing the relaxation necessary for adequate exposure, and may make general anesthesia safer.

In our experience no anesthesia has been as satisfactory as spinal anesthesia with procaine. If vasoconstrictor drugs are employed to prevent a precipitous drop in blood pressure, this method of anesthetization is without effect on the hepatic parenchyma. It provides maximal relaxation with a minimal possibility of adding to the hepatic injury already present. In operations on the common bile duct continuous or serial spinal anesthesia should be used.

The serious reactions so frequently observed following general anesthesia for biliary surgery are without doubt often due to further degeneration or necrosis of the liver induced by long periods of anesthetization with hepatotoxic agents and to anoxemia, a state to which the liver parenchyma is exceedingly susceptible.

### *Difficulties of cholecystic surgery*

I have already alluded to the many disabling, if not fatal, injuries which may result from operations on the biliary passages. Many of the tragic results which we see are due to the teaching that simple cholecystic surgery is easy, that such operations require only limited experience, and that ductal or vascular injury will not occur if the gallbladder is removed from the fundus toward the common bile duct.

The truth of the matter is that, prior to operation, no surgeon can be sure what conditions will be met and what procedure will be necessary. Even with ideal relaxation and exposure the surgon of limited experience is much too often unfamiliar with anomalies in the arrangements of blood vessels and bile ducts. Nor will any method utilized for removal of the gallbladder obviate disastrous or fatal injuries.

We have seen strictures and external fistulae produced by both methods of removing the gallbladder. In fact, the only complete division of the common bile duct I have seen occurred during an operation in which the dissection began at the fundus. Unless great care is taken with hemostasis, the fundal-ductal procedure is more likely to be associated with injuries than is the opposite method. No surgeon should be bound by a single technique. He should be sufficiently versatile to use any of several methods, depending upon what he finds at exploration.

The time to repair an injured duct is at the time of its injury. Subsequent operations are always difficult, and are less apt to be followed by a good result.

The severed ends of the duct must be carefully exposed and joined in such a manner as to have intimate mucosal contact. This anastomosis had best be done over a tube, rubber or otherwise, which if brought to the exterior should emerge from a separate opening in the distal portion of the duct. The anastomosis should be done without tension. Far too often an impatient operator fails to take the time necessary to find the distal end of the duct, and contents himself with a ductal-small bowel anastomosis. Such a procedure is too often doomed to failure from the start. It is only after the most careful search fails to disclose the distal portion of the duct that another type of anastomosis should be done. The use of the defunctionalized single loop, as suggested by Cole, Ireneus and Reynolds(3) deserves earnest consideration.

Finally, I would like to say a word about drainage subsequent to biliary tract operations, simple or otherwise. I have never been able to follow the reasoning of those who advocate non-drainage. Adhesions between the liver and bowel occur, regardless of whether drainage is used or not. One need only place a drain in the subhepatic fossa to see what passes into this space following even the simplest operation. Small accessory ducts passing from the liver to the gall-

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3. Cole, W. H., Ireneus, C., Jr., and Reynolds, J. T.: The Use of Vitallium Tubes in Strictures and Absence of the Common Bile Duct, Ann. Surg. 122:490-521 (Oct.) 1945.

bladder occur rather frequently. Since these are often overlooked and not ligated, drainage is all the more important.

Some years ago a distinguished American surgeon said that the failure to put in a drain following a gallbladder operation would be regretted in not more than 2 patients in 100. Today a mortality of 2 per cent following simple cholecystectomy calls for careful scrutiny. The mortality associated with bile peritonitis is approximately 25 per cent. This condition can be avoided in nearly every instance if drainage is instituted at the time of operation.

### *Indications for exploring the common bile duct*

All too often the hurried or inexperienced operator fails to examine the common bile duct at the time of cholecystectomy. Not all common bile ducts need to be investigated, but many more difficulties have arisen from failure to explore them than from exploration. The common bile duct should be examined when there is a history of jaundice, no matter how long before operation; when the gallbladder contains many small stones; and especially when the cystic duct is short and large. Every dilated common bile duct should be explored, and exploration should be mandatory in every case in which there is the slightest question as to its advisability. The time to investigate the common duct is at the original operation, and once the duct is opened it should be explored proximally as well as distally, for stones have a peculiar method of finding their way into the proximal ducts.

Wilkie(4) found common bile duct stones in 18 per cent of patients operated on for cholelithiasis, and Clute(5) found them in 8.4 per cent of his patients. Lahey's findings(6) were similar to Wilkie's. We may safely assume that in one out of every 5 patients with cholelithiasis stones will be found in the common bile duct. While liver stones do form occasionally, they are rare. In the majority of instances they form in the gallbladder and move into the liver by way of the common bile duct. A faceted stone found in the common bile duct at a second operation is hard to explain on the basis of hepatic origin.

### *Preoperative and Postoperative Care*

The average patient with cholelithiasis requires little specific preoperative care, but the complicated case requires a great deal. This statement is especially true of patients with advanced liver disease, whether they are jaundiced or not.

Twenty years ago emphasis was placed almost entirely on the preoperative administration of glucose by the intravenous route. It was believed, following the work of Opie and Alford(7) and of Whipple(8), that a large amount of glycogen in the liver would make operation safer. It was not until the observations of Goldschmidt, Vars and myself(9) demonstrated that the lipid content of the liver is a major factor in conditioning the liver to injury during anesthesia and operation, and that protein is a more effectual lipotropic agent than carbohydrate, that a more rational basis of dietary therapy was adopted.

It is now generally accepted that a diet offering approximately 75 per cent of its calories as carbohydrate, 20 per cent as protein, and not more than 5 per cent as fat is an efficient diet for both preoperative and postoperative therapy. The protein must be a complete protein containing the essential amino acids. The patient should eat at least 3,000 calories a day, and only if this dietary level is not attained is intravenous therapy necessary or even helpful. It is not necessary to add methionine to such a diet, for when complete proteins are used and ingested in the amounts indicated no further methionine is required. Only when the protein is deficient or the ingestion of food inadequate need a methionine supplement be used. Since indications for an emergency surgical procedure are rare, the diet may be continued for several weeks if necessary before operation.

During the preoperative period oral and, if necessary, parenteral vitamin K therapy should be instituted, even if the prothrombin time is normal, for operation and anesthesia

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4. Wilkie, D.P.D.: Address on Some Aspects of Gall-Bladder Disease, Brit. M. J. 1:481-484 (March 24) 1928.
5. Clute, H. M.: Common Duct Stones, J.A.M.A. 95:1568-1571 (Nov. 22) 1930.
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9. Goldschmidt, S., Vars, H. M. and Ravdin, I. S.: The Influence of Foodstuffs upon the Susceptibility of the Liver to Injury by Chloroform, and the Probable Mechanism of their Action, J. Clin. Investigation 18:277-289 (May) 1939.

may cause a marked fall in previously normal values. Thiamine, riboflavin, and nicotinic acid should be administered, for these vitamins play important roles in the intermediary metabolism of foodstuffs. Vitamin C should be given to insure capillary integrity and good wound healing.

Tumen and Bockus(10) found hypo-albuminemia "in every case of chronic advanced liver disease and in most cases of obstructive jaundice." They interpreted this finding as an indication of a disturbance in liver function. In our opinion the best way to correct it is to provide the building stones necessary for hepatic repair. These are afforded in the diet which has been suggested. The irresistible tendency of the liver to regenerate under favorable circumstances makes diet all the more important. It is amazing how much repair will occur if extensive cirrhosis has not taken place.

There is not now known any method of intravenous therapy which, over a period of days, can remotely equal oral therapy, either before or after operation. The adoption of early ambulation in all patients who have had biliary tract surgery causes an earlier return to normal intestinal function and makes possible the supplanting of intravenous therapy by oral diet. Intravenous therapy is rarely necessary for more than twenty-four hours following operation.

Even the chills and fever of cholangitis no longer force us to operate on the unprepared patient. Streptomycin, when administered subcutaneously in doses of 150,000 units every three hours, soon brings the infection under control.

If large amounts of bile are drained to the exterior for many days after operation, a portion of this bile should be given to the patient. Nothing is gained by continuing drainage to the exterior once the common bile duct is proven patulous. If at this time the tube is clamped, the enterohepatic circulation of the bile salts will be resumed, to the benefit of the patient.

No tube should be removed from the common bile duct until a cholangiogram has been done, approximately one week after operation. If debris or a stone is found to be present, the use of the Pribram ether and oil method(11) will frequently obviate a secondary operation.

### *Conclusions*

It has not been possible to refer more than briefly to a few of the problems of biliary tract surgery. Many of the problems are as yet unsolved, and even those for which a satisfactory solution appears to be available at present may in the future be dealt with on a more reasonable basis. Medicine, and surgery as a part of it, is an ever-expanding science. With an extension of our knowledge of normal function and of the abnormalities which occur in disease will come a wider understanding of the pathologic physiology of all disease, and more intelligent and safer therapy. It is now nearly three-quarters of a century since the first cholecystectomy was performed. We have learned a great deal, but more remains to be done.

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11. Pribram, B. O. C.: Ether Treatment of Gall-Stones Impacted in the Common Duct, Lancet 1:1311-1313 (June 10) 1939.

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# REVIVAL OF EXTRAPLEURAL PNEUMONOLYSIS WITH THE USE OF A NEW FILLING MATERIAL, METHYL METHACRYLATE

## *Report of Thirty-One Cases*

IRENE McCAIN*
PHILADELPHIA
*and*
PAUL P. McCAIN, M.D.†
SANATORIUM

Extrapleural pneumonolysis has recently been revived with the use of a new filling material, methyl methacrylate, commonly known as "lucite." After more than twenty months of experiments on animals, Wilson(1) began to apply the procedure to human patients with pulmonary tuberculosis. Through September, 1946, approximately 60 patients have had this operation at Duke Hospital. Thirty-one of these patients were from the North Carolina Sanatorium, and it is upon these 31 cases that this report is based.

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From the North Carolina Sanatorium, Sanatorium, N. C.

*Medical student, University of Pennsylvania School of Medicine, Philadelphia, Pa.

†Late Medical Director and Superintendent, North Carolina Sanatoria, Sanatorium, N. C.

1. Wilson, D. A. and Baker, H.: Experimental Surgical Pulmonary Collapse, Surg., Gynec. & Obst. 82:735-742 (June) 1946.

### *History*

The operation of extrapleural pneumonolysis, which consists in stripping away the parietal pleura from the chest wall over the area to be collapsed, was first described by Tuffier(2) in 1891. He was the first to recommend that the artificially created space be filled with fat from the patient in order to maintain collapse of the lung(3). Fat is no longer used, since it is so difficult to find on a tuberculous patient and is apt to atrophy(4). Other substances have been tried with varying success. Gauze was discarded because it could not be left in place permanently, and because there was a high incidence of infection(5). For the same reason, crumpled rubber sheeting is no longer used(5). Inflated rubber balloons give good temporary results, but are unsatisfactory because the air soon leaks out(4b). Air alone has been tried as a filling material (extrapleural pneumothorax), but has been largely rejected because of the frequency of complications, the uncertainty of end-results, and the rapidity with which the air is lost, making frequent refills necessary(6,4b). Pectoralis muscle has the advantage of being living tissue(7), but it can be used only in small spaces, and in time shows fibrous shrinkage(4b,5). Most workers have preferred paraffin and paraffin mixtures as filling materials(4b,8), but these have the disadvantage of setting up a severe foreign-body reaction in many cases(9). Thus, before extrapleural pneumonolysis could become a satisfactory surgical procedure, a filling material had to be found which would not shrink or be absorbed or irritate the tissues(4a,5,8).

Wilson began experimenting with various substances in the fall of 1943; his studies indicated that perhaps methyl methacrylate was the answer(1,10). Bellas(11) and Woolf(12) had previously shown that there was very little, if any, tissue reaction to this substance. Wilson first used methyl methacrylate in the form of packs molded into the shape of extrapleural spaces created in experimental animals. He later devised small spheres for use in filling irregular spaces. Solid spheres were used for a time, but were discarded because of their weight. The spheres finally developed for use in human patients were 1 inch in diameter, hollow, and very light.* After their manufacture, the spheres are sealed under sterile conditions and are tested against high negative and positive pressures alternately for leakage. Their sterilization is easily accomplished by exposure to ultraviolet light for three hours on each side. After being soaked over-night in a 1:1000 aqueous solution of Zephiran, they are ready for use the next day. The number of spheres used depends on the size of the space to be filled, and has varied from 20 to 120.

Wilson's original procedure was performed through an anterior approach. A 4-inch incision is made over the second rib, and 4 inches of rib are removed, care being taken to preserve the periosteum. Blunt dissection is used to free the parietal pleura from the chest wall over the area to be collapsed, and the space thus created is filled with methyl methacrylate spheres. The rib and periosteum are then sutured back in place. This operation is performed under local anesthesia, and usually requires less than forty-five minutes.

Although in many cases a good collapse was obtained with the anterior approach, a number of cavities failed to close. An attempt to improve results brought forth the posterior approach(13). In this procedure, the usual thoracoplasty incision is made under general anesthesia, the scapula is retracted, and the operation is then carried out as in the anterior approach, after a segment of rib has been removed adjacent to the area requiring collapse. Others papers on the subject by Dr. Wilson are to appear in the October, 1946, issue of *Surgical Clinics of North America*(10) and in an early edition of the *Journal of Thoracic Surgery*(14).

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*Methyl methacrylate spheres are manufactured by Nickois Products Co., Moorestown, N. J.

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13. McIndoe, R. B., Steele, J. D., Jr., and Alexander, J.: Extrapleural Pneumonolysis with Paraffin Filling; Late Results, Am. Rev. Tuberc. 40:243-254 (Sept.) 1939.

### *Method of Study*

The material for this report was drawn from the records of the North Carolina Sanatorium and Duke Hospital, from discussions with members of the staffs of the two institutions, and from facts obtained by examining and interviewing the patients themselves. On September 22, 1946, fourteen months had elapsed since the first operation was performed, and two weeks since the last.

It is not the purpose of this article to pass final judgment on the procedure, but rather to summarize the results thus far obtained.

### *Selection of Cases*

All except 1 of the 31 patients who were operated on had consistently positive sputum on direct smear, and all except one other had one or more areas of cavitation in one or both lungs visible on routine roentgenogram. Repeated concentrated smears of the sputum in case 7 were negative, but this patient had bilateral apical cavities which had failed to improve after three years of bed rest and pneumoperitoneum. In case 21, routine smears of the sputum were persistently positive, but no cavities could be made out on routine roentgenograms. (See table 1.)

The ages of the patients at the time of operation varied from 22 to 65 years, averaging 43 years. All except 6 had had clinical tuberculosis for more than three years, and the average duration in all cases was about seven years.

Thirty cases were classified (National Tuberculosis Association classification) as far-advanced on the operated side, and 1 as moderately advanced. Forty-five per cent of the patients had far-advanced disease on the unoperated side, 36 per cent had moderately advanced tuberculosis, and 13 per cent had minimal tuberculosis. Two patients had no demonstrable disease on the unoperated side.

Some type of collapse therapy had been previously tried in every case except case 25. This was a 65-year-old man with bilateral cavities, whose symptoms were of only a few weeks' duration. Ninety-three per cent of the patients had been tried on pneumothorax; 81 per cent had received at least one phrenic crush; and pneumoperitoneum had been used in 71 per cent. One of the patients had had thoracoplasty on the contralateral side, while 5 patients received the operation as a supplement to a previous thoracoplasty on the same side. (See table 2.)

### *Results*

In 9 cases, or 30 per cent, all cavities were closed, and routine or concentrated sputa were converted to negative. Nine other patients noted improvement in symptoms without sputum conversion. In 1 patient who obtained satisfactory cavity closure, the sputum was negative before operation. Thus, 19, or 60 per cent, of the patients were improved by operation. To date, no case has shown a spread of tuberculosis to the contralateral side following the operation.

The condition of 13 per cent of the patients was not changed by the procedure, and 1 patient is apparently worse as a result of the operation. There were 5 deaths in the series. At least 2 of these patients had been considered hopelessly ill for many months prior to operation. Four operations were not completed because of complications encountered.

Of the 19 patients on whom the anterior approach was used, 12 have shown clinical improvement. Similar improvement was noted in 2 out of the 3 patients who were operated on through the posterior approach. Of the 5 patients who had had a previous thoracoplasty on the same side, only 1 has been significantly benefited. Three patients have had the operation twice on one side, and 2 have had bilateral operations.

### *Complications*

The complications encountered at operation were:

1. Extrapleural adhesions, which may make difficult or impossible the complete stripping away of the parietal pleura from the chest wall (cases 23, 24, and 27).
2. Penetration of the pleural space (case 22).
3. Penetration of a tuberculous cavity (cases 15, 16, and 31).
4. Extrapleural hemorrhage (case 29).

Complications encountered following operation were:

1. Hypoxia, a temporary complication in most cases, and the apparent cause of death in 2 cases (cases 19 and 20).

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14. Wilson, D. A.: Article to be published in J. Thorac. Surg.

### Table 1

Summary of the operative procedures, the preoperative condition, and the postoperative results in 31 patients from the North Carolina Sanatorium upon whom extrapleural pneumonolysis with the use of methyl methacrylate spheres as packing material was performed.

| Case No. | *Extent of Disease Before Operation* | | *Type and Date of Operation* | | *Present Status* | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | *Right* | *Left* | *Right* | *Left* | *Cough* | *Amount of sputum* | *Sputum examinations* | *Weight gain or loss* | |
| 1. | FA, cav, thoraco | MA, fib | Ant 7/45<br>Post 12/45 | | I | I | N | +12 | Improved. |
| 2. | FA, cav | FA, cav | | Ant 9/45 | I | I | N | +12 | Improved. |
| 3. | MA, fib | FA, cav | | Ant 9/45 | S | S | P | +20 | Unimproved. |
| 4. | FA, cav | Min | Ant 10/45 | | W | W | P | + 5 | Worse. |
| 5. | None | FA, cav basal | | Ant 11/45 | I | I | P | S | Improved. |
| 6. | FA, fib | FA, cav | | Ant 11/45 | I | I | N | +15 | Improved. |
| 7. | FA, cav | MA, cav | Ant 12/45 | Ant 11/45 | I | I | N | +14 | Improved. Sputum negative before operation. |
| 8. | FA, thoraco | FA, cav | | Ant 12/45 | I | S | P | S | Slightly improved. |
| 9. | FA, cav | FA, cav | Post 4/46 | Ant 12/45 | I | I | N | + 5 | Improved. |
| 10. | FA, cavs | FA, cavs | Ant 1/46 | Ant 12/45 | S | S | P | +10 | Same; to have more surgery. |
| 11. | FA, cav | MA, fib | Ant 12/45 | | I | I | N | +13 | Improved. |
| 12. | FA, cav, thoraco | FA, act | Ant 1/46 | | W | S | P | S | Unimproved. |
| 13. | None | FA, cav | | Ant 1/46<br>Post 5/46 | I | I | N | S | Improved after supplementary pneumoperitoneum. |
| 14. | MA, cav | FA, cav | | Ant 1/46 | I | I | P | −10 | Same; cavity smaller. |
| 15. | FA, cav | FA, cav | Ant 1/46 | | | | | | Cavity entered at operation; died 1 month later. |
| 16. | FA, cav | FA, cav | | Ant 1/46 | | | | | Cavity entered at operation; died of hemorrhage next day. |
| 17. | FA, cav, pnx | FA, cav | | Ant 1/46 | I | I | P | − 5 | Left side improved. |
| 18. | FA, cav | MA, fib | Ant 2/46 | | I | I | N | − 3 | Improved. |
| 19. | FA, cavs | FA, cav | | Ant 2/46 | | | | | Died 1 day after operation of anoxia. |
| 20. | FA, cav | FA, fib | Ant 2/46 | | I | I | N | +15 | Improved. |
| 21. | Min, calc | FA, no cav | | Ant 3/46 | I | I | P | + 9 | Symptoms improved, but sputum remains positive. |
| 22. | MA, cav | MA, fib | Ant 3/46 | | S | S | P | S | Pleural space entered at operation; operation stopped. |
| 23. | FA, cav | Min, fib | Post 3/46 | | I | I | N | + 3 | Spheres removed 6 months later because of extrapleural tuberculous empyema. |
| 24. | MA, cav | Min, fib | Ant 4/46 | | I | I | P | +19 | Improved symptomatically. |
| 25. | FA, cav | MA, cav | Ant 5/46 | | I | I | P | + 5 | Awaiting surgery on left side. |
| 26. | FA, cav, thoraco | MA, fib | Post 7/46 | | W | I | P | S | Unimproved. |
| 27. | FA, cavs | FA, fib | Post 7/46 | | | | | | Died 2 mos. post-operatively of severe empyema, ischemic necrosis of ribs, and broncho-pleuro-cutaneous fistula. |
| 28. | FA, cav basal | MA, fib | Post 9/46 | | I | I | P | — | Symptoms improved except for temporary severe pain. |
| 29. | FA, cav, thoraco | MA, fib | Post 7/46 | | | | | | Died 2 days after operation of hemorrhage and anoxia. |
| 30. | FA, cavs | FA, cav | | Ant 9/46 | I | I | P | — | No change as yet. |
| 31. | FA, cav | FA, cav | Ant 9/46 | | | | | | Cavity entered; operation stopped. |

KEY: FA—far advanced; MA—moderately advanced; min—minimal; cav—cavity; act—active; fib—relatively stable; calc—calcified; thoraco—thoracoplasty; pnx—pneumothorax; I—improved; S—same; W—worse; N—negative; P—positive; ant—anterior approach; post—posterior approach.

**Table 2**

Summary of extent of collapse therapy applied to 31 patients from the North Carolina Sanatorium, prior to extrapleural pneumonolysis.

| *Case No.* | *Age* | *Sex* | *Known Duration of Tbc. (years)* | *Prior Pneumothorax* | | *Prior Phrenic Crush* | | *Prior Pneumoperitoneum* | *Prior Thorocoplasty* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Right* | *Left* | *Right* | *Left* | | *Right* | *Left* |
| 1. | 46 | m | 4 | '43—F | | '43 | | | '44 | |
| 2. | 46 | m | 5 | '41-'45 | | | '45 | 1/45 to 5/45 | | |
| 3. | 43 | m | 3 | | '43—F | | '43 | 10/43 to 6/44 | | '44 |
| 4. | 32 | f | 12 | '34-'35 | '35—F | '34 | | 7/43 to 9/45 | | |
| 5. | 50 | m | 7 | '41-'45 | | | '41, '44 | | | |
| 6. | 55 | m | 5 | | '42—F | | | 1/43 to 2/45 | | |
| 7. | 33 | f | 6 | '42—F | '44—F | | '12 | 12/42 to 11/45 | | |
| 8. | 35 | m | 9 | '38—F | '43—F | '38 | | | '40 | |
| 9. | 37 | m | 22 | '36-'38; '39—F | | | | 6/40 to 11/45 | | |
| 10. | 53 | m | 20 | | '42—F | | '42, '44 | 3/44 to 12/45 | | |
| 11. | 63 | f | 2 | '44—F | | '44 | | 3/44 to 1/45 | | |
| 12. | 31 | m | 13 | '36-'45 | '38-'39 | '36 | | | '45 | |
| 13. | 29 | m | 4 | | '45—F | | | 9/45 to 12/45 | | |
| 14. | 43 | f | 5 | '41—F | '41-'45 | | | 4/43 to 1/46 | | |
| 15. | 47 | m | 5 | '41-'45 | | '41 | | | | |
| 16. | 48 | m | 1 | | '45—F | | '45 | 4/45 to 9/45 | | |
| 17. | 26 | f | 3 | '43 | '43-'43 | | '44 | | | |
| 18. | 41 | f | 8 | '38-'39 | | '38 | | 1/45 to 4/45 (also 9/45-2/46) | | |
| 19. | 22 | f | 7 | '40-'41 | '39—F | | '44 | 1/44 to 1/46 | | |
| 20. | 40 | m | 11 | '44—F | '44-'45 | | '45 | 6/45 to 10/45 | | |
| 21. | 39 | f | 3 | | | | '45 | 5/45 to 1/46 | | |
| 22. | 27 | m | 6 | '40-'45 | '42-'44 | '41 | '42 | 1/46 to 3/46 | | |
| 23. | 40 | m | 2 | '44—F | | '44 | | 12/44 to 3/46 | | |
| 24. | 42 | m | 1 | '45—F | | '45 | | 1/46 to 3/46 | | |
| 25. | 65 | m | 1 | | | | | | | |
| 26. | 37 | m | 2 | '44-'45 | | '44 | | 10/44 to 4/45 | '45 | |
| 27. | 51 | m | 26 | '45—F | | '42 | | 10/45 to 6/46 | | |
| 28. | 28 | m | 5 | '41—F | | '44 | | 6/42 to 1/45 | | |
| 29. | 55 | f | 9 | | '37—F | | '42 | | '43 | |
| 30. | 39 | m | 7 | | '45—F | | '45 | 9/45 to 5/46 | | |
| 31. | 50 | m | 7 | '39-'40 | '39-'40 | | '40 | | | |

KEY: F—failure or abandonment of brief, ineffectualpneumothorax.

2. Migration of spheres into the neck (case 3), and into subcutaneous tissues of the chest wall (case 25).

3. Subcutaneous emphysema (cases 16 and 29).

4. Involvement of ribs; failure to mend (case 25), and ischemic necrosis proven at autopsy (case 27).

5. Appearance of sterile subcutaneous fluid in the region of the incision (cases 11 and 20).

6. Superior mediastinal compression, relieved by removal of spheres (case 29).

7. Excessive formation of fluid around spheres, without infection (case 9), and with tuberculous infection and involvement of the tissues of the chest wall (cases 23 and 27).

## *Comment*

Extrapleural pneumonolysis with the use of methyl methacrylate spheres as packing material was primarily devised for those patients who had failed to respond to bed rest, pneumothorax, diaphragmatic paralysis, pneumoperitoneum and at times thoracoplasty, and particularly for those patients in whom thoracoplasty, or revision of thoracoplasty, is contraindicated because of general condition, impaired respiratory reserve, age, or bilateral disease. Cases 5 and 6, however, were considered good thoracoplasty risks, and the operation was done in quest of further information. These criteria for selecting patients are similar to those generally used for extrapleural pneumonolysis, regardless of the filling material(8,13,15).

In evaluating this operation, it is essential to measure success not only in terms of sputum conversion and obliteration of cavities on roentgenograms, but also in terms of symptomatic improvement. Most of the patients on whom the operation has been performed, had had tuberculosis for many years, with such extensive pulmonary involvement that drastic improvement was out of the question. To these patients significant

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15. Alexander, J.: Supraperiosteal and Subcostal Pneumonolysis with Filling of Pectoral Muscles, Arch. Surg. 28: 538-547 (March) 1934.

relief of symptoms is a gratifying result. It is to be emphasized that in all but 2 cases, no other treatment except a continuation of prolonged bed rest was feasible.

In 10 cases excellent results have been obtained, the sputum becoming negative in 9, and remaining negative in the other (the patient whose sputum was negative before operation). In 8 the sputum has been negative on repeated 72-hour concentrated smears. In 3 cases the sputum became negative immediately after operation; in 5 cases it remained positive for three to five months, and in 1 it became negative only after pneumoperitoneum had been added six months postoperatively. There is a distinct possibility that, in time, sputum conversion may take place in more of these cases; but in others, tuberculosis on the contralateral side continues to present a therapeutic problem.

In addition to the 10 patients with negative sputa, 9 others have shown significant symptomatic improvement. In time, it is reasonable to look for more conversions in this group.

The anterior approach is appreciably less extensive and less shocking a procedure than the posterior approach. Following the latter operation, which is roughly comparable in operative trauma to a thoracoplasty stage, the patients are longer in regaining their strength, and pain is apt to be more severe and prolonged. The period of follow-up is too short and the number of cases too small for accurate comparison of the results from the two procedures, but at present the additional risk of the posterior approach does not seem to be justified by the results.

The results in cases where extrapleural packing with methyl methacrylate spheres has been used in lieu of revision of thoracoplasty have not been as good as had been hoped. One of these patients died, 3 have remained the same, and 1 has had his sputum converted to negative. Conclusions cannot be drawn from so few cases, but it seems possible that, as experience and knowledge are gained, more careful selection of cases may improve the results.

Most of the serious complications have occurred as a direct result of technical difficulties encountered in extrapleural dissection: penetration of the pleural space or of a tuberculous cavity, penetration into actively inflamed extrapleural tuberculous tissue, and extrapleural hemorrhage. The only serious complication which can be attributed to the presence of methyl methacrylate in the extrapleural space is the formation of large amounts of fluid, which later became tuberculous in 2 cases (cases 23 and 27). It is the current opinion of staff members of both hospitals that dissection through tuberculous extrapleural inflammatory tissue was responsible for this complication, and the presence of such inflammation at operation is now considered a strong indication for promptly discontinuing the operation without packing the space.

Five of the 31 patients have died—not a prohibitive mortality in cases with such a poor pre-operative prognosis.

One disadvantage of the method is the confusing appearance of the spheres on roentgenograms, on which they appear as multiple cavities. Search for persistent cavitation beneath the spheres must be carried out by laminography.

One advantage of the procedure is that the number of spheres may be varied so as to fill a space of any size. They may also be used to fill a space created at the base of the lung for collapsing basal cavities (cases 5 and 28). The hollow spheres are light, and apparently do not cause any significant foreign-body reaction. Methyl methacrylate does not dissolve, nor is it absorbed.

### *Summary*

Extrapleural pneumonolysis with the use of methyl methacrylate spheres as packing material has been performed with varying success on 31 patients with advanced pulmonary tuberculosis from the North Carolina Sanatorium. The indications, contraindications, complications, and results are briefly discussed.

### *Conclusions*

1. Extrapleural pneumonolysis with the use of methyl methacrylate spheres as packing material appears to offer a reasonably safe means of selective collapse therapy in a limited group of patients with pulmonary tuberculosis for whom no other method of collapse is possible.

2. The operation is not without risk, the most serious complications being incidental to penetration of the pleural space and tuberculous cavities, and to infection. The means of preventing these complications has apparently been determined.

3. The anterior approach under local

anesthesia is less shocking to the patient than the posterior thoracoplasty-type approach, and is to be preferred because of the serious risk involved in any operative procedure performed upon cases correctly selected for this new operation.

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## DEFINITIVE SEX ENDOCRINE THERAPY IN THE FEMALE

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During the past few years the energy and effort of clinicians, teachers, and investigators were of necessity directed to the immediate task of treating human beings; pure research was incidental. This fact was especially true in the field of endocrinology.

This shake-down and retrenchment period was not without value. The enormous advances made in our knowledge of the ductless glands during the past two decades naturally provoked prodigious writings and lectures on the subject. The transition from "gland doctor" to "endocrinologist" automatically eliminated many of the less scrupulous specialists; yet honest zeal and interest, as well as professional expedience and opportunism, have accumulated many and conflicting data in the field of endocrinology. Premature publication, unchecked experimentation, deductions based solely on animal experiments, failure to allow for altering factors, and the natural tendency to carry a project in the direction of one's interest have caused perplexities. Understandable haste on the part of the manufacturers, bizarre terminology, many methods of standardization, and varied dosage contributed to the confusion.

The war period demanded definitive medicine, simplification, and standardization. The quasi-scientists were displaced, and an opportunity for clear thinking and evaluation was afforded. The two national publications devoted to endocrinology are fortunately staffed by capable boards; the material is scrupulously reviewed and is generally trustworthy. This particular locality has been most fortunate in the availability of Hamblen and, for a while, Grollman in the guidance of endocrinotherapeutic thought.

At present there are potent and useful products at hand which should be utilized with intelligence and confidence in the treatment of some abnormalities of the female. It must be remembered that endocrine therapy is substitutional therapy, as the effect ceases with cessation of treatment. The initial course of treatment is usually the most beneficial; since the patient generally becomes refractive to therapy, continued or sustained benefit cannot be promised. Constant vigilance is necessary because of the possibility of abnormal reactions. Oral medication may become self-medication, and must be supervised.

In this discussion only the conditions encountered in obstetric and gynecologic practice will be mentioned; products will be suggested in general terms; the strict regimen of treatment will not be outlined, and diagnostic procedures will not be given. Certainly there is no intention of precluding other known methods of value which are not discussed herein. The bibliography is too large to mention in a paper of this limited scope; the names and facts are now part of medical history.

### *In the Newborn*

Lewis and TeLinde early employed estrogenic substances to aid in combatting vulvovaginitis of the newborn. The stimulating effect of estrogens on genital tissue is well known, and local resistance to infection is strengthened by bringing the immature vaginal tissue into maturity.

### *At the Menarche*

While a state of emotional and physical instability frequently exists at the menarche, we seldom encounter gynecologic abnormalities that require endocrine therapy. At this epoch particularly we should remember the "two-edged sword" possibilities of potent substances. In this early part of the female endocrine life pulverized extract of thyroid gland has been found to be one of the most dependable endocrine products — a fact which again and again is brought to mind in the search for effective therapeutic aids in medical gynecology. Gonadotropins, anterior pituitary extract, and estrogens may at times be given to help direct the physiology toward normal, but the indications for such therapy must be understood and the results closely followed.

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Read before the Section on Gynecology and Obstetrics, Medical Society of the State of North Carolina, Pinehurst, May 2, 1946.

Amenorrhea in itself becomes a problem chiefly when pregnancy is desired. If the patient has the physical equipment it is not difficult to produce at least uterine bleeding, but cyclic repetition and normal menstruation are difficult to attain. Several courses of estrogen therapy, estrogen-progesterone cyclic therapy, gonadotropic therapy, or a well directed combination or sequence of these methods may be of value.

The use of endocrine products in the treatment of dysmenorrhea has been disappointing. Progesterone by hypodermic and by mouth may be given over most of the interval between periods, and in some instances seems to help. Tension and discomfort have been relieved by the control of salt and electrolyte balance, as has been advocated by Freed and others.

### *In the Treatment of Infertility*

The agenetic couple must be considered as a gynecologic problem, at least until the urologists employ the accepted criteria for study and treatment of the male partner. The results from the use of testosterone in males with low sperm counts or a disproportionate number of abnormal forms have been disappointing. It is estimated that in 10 to 20 per cent of the infertile marriages the male partner is responsible; in such cases the salvage rate is not over 25 per cent. If it is the female partner who is infertile, successful therapy depends upon careful examination and counselling in approximately 50 per cent of the cases, upon insufflation of the tubes in 25 per cent, and upon the administration of hormones, including thyroid extract, in probably 25 per cent. The estrogens are definitely beneficial in hypoplasia of the genital tissue; growth can be noted while estrogens are being given.

The problem of producing ovulation when it does not occur naturally is most difficult. The various preparations to cause ovulation are relatively ineffective in the presence of ovarian failure. Hamblen has described the "one-two" cyclic gonadotropic regimen, and has had success with its use in many cases. He stresses the necessity of skin testing for sensitivity to equine gonadotropin before each course of therapy. Many aids in the determination of ovulation are used—assays, biopsies, cellular response, and electric potential—but the simple expedient of recording the daily matin oral temperature probably affords most information. This is a valuable index in the initiation and follow-up of therapy.

It is well to recall that the patient who experiences difficulty in becoming pregnant may experience difficulty in seeing it through.

### *In Pregnancy*

Rock and his co-workers, and the Carnegie group have shown that bleeding during the early weeks of pregnancy is not too unusual—a fact that many clinicians have suspected. If immediate hormonal adjustment on the part of the female is necessary to the continuation of pregnancy, we can expect a high percentage of abortions, and if failure to make this adjustment is the chief factor in the causation of abortions, we should expect to salvage a large number of these by the use of proper substitutional therapy. This expectation is not always borne out. Progesterone is the product that would be expected to prevent abortions, but it has proven disappointing when used alone. Davis and Hamblen were among the first to suggest the use of combined estrogen-progesterone therapy in the prevention of abortion. Recently Vaux and Rakoff have reported favorably on this method.

There are undoubtedly many factors which may cause abortion, of which hormonal aberration is only one. Vitamins are probably as important as the hormones, and variations in them are more apt to occur. The body can at times elaborate hormones better than it can obtain and metabolize vitamins. Vitamins can be considered exogenous hormones. Chemically, there is very little structural difference between vitamin A, for instance, and estrogens. Vitamin E, the so-called "fertility vitamin," is plentiful in this locality, even in pellagra-producing diets.

One cannot escape the thought that a normal person normally pregnant is apt to continue a normal course.

### *At the Climacteric*

At the climacteric we again encounter emotional and endocrine chaos in varying degrees. This period is marked by ovarian failure—natural, surgical, or roentgenologic. As the production of progesterone and later of estrogen gradually ceases, the anterior pituitary loses inhibition. Other glands, notably the adrenal, take on renewed activity, manifested by increased ketosteroid elaboration and, symptomatically, by increased medullary activity. Subjectively the patient complains of vasomotor instability, "flashes," emotional upsets, and other symptoms associated with the climacteric.

Fortunately, in the majority of women the hormonal alteration is not so revolutionary and the symptoms, especially if they are anticipated and conditioned, are milder and easily controlled. When symptoms are moderate or severe, estrogens are of definite benefit. Flashes, headaches, joint and eye symptoms, and weakness all seem to improve when the estrogens are used. The dosage should be kept at a minimum, begun early, and discontinued, even if only temporarily, as soon as possible. In a patient who has had her menopause one to two years previously, a reappearance of vaginal bleeding is most disturbing. Stilbestrol is of distinct value, but since it is oral medication, its use must be controlled.

### *Summary*

An effort has been made to evaluate the endocrine products that have proven their value in a period that placed emphasis on the true worth of therapeutic agents. It is evident that some potent products are available which can be relied upon when properly employed and properly supervised. They are valuable aids in the treatment of endocrine disorders in the female.

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### New Labels for Old

The sale of medicine by druggists and their purchase by consumers have been simplified in the past year through revision of thousands of drug labels in accordance with new regulations of the Federal Food and Drug Administration.

New drug labels at the same time have helped dissipate an artificial distinction between medical manufacturers and have sharpened the natural difference between types of medicine.

One year ago FDA Regulation No. 2.106 simplified the sale of medicine for consumers and druggists by requiring:

(1) All medicines that are "safe and efficacious" in the hands of the lay public must bear adequate directions for use. In general, these include "all the ordinary" laxatives, iron compounds, cough and cold preparations, pain-relievers (or analgesics), vitamins, tonics, pile ointments, antacids and antiseptics. Products bearing labels which give directions for use may be purchased over the counter by anyone, with or without a prescription.

(2) All other medicines must carry the legend, "Caution to be dispensed only by or on the prescription of a physician." These include more potent preparations such as penicillin, the sulfa drugs, barbiturates, heart stimulants, arsenicals, antitoxins, and many others. Medicines bearing the Rx label cannot be sold legally except on prescription.

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# TORSION OF THE SPERMATIC CORD

## *Review of Six Cases*

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*and*

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Torsion of the spermatic cord is defined by Wolf(1) as a condition causing temporary or permanent, partial or complete constriction of the blood supply to the testicle and its adnexa by sudden, vertical, axial twisting of the testicular attachment of the spermatic cord. This condition constitutes one of the few surgical emergencies encountered in the practice of urology. The diagnosis must be made and surgical intervention carried out within the space of a few hours if treatment is to give satisfactory results. Conservatism has little or no place in the treatment of these cases.

We wish to report 6 cases of torsion of the spermatic cord that we have seen in Watts Hospital since 1940, and to give a brief resume' of some of the literature on the subject.

### *Incidence, Age, and Side Affected*

According to Ewert and Hoffman(2), 451 cases of torsion of the spermatic cord were reported between 1840 and 1939. Between 1939 and 1942, 34 cases appeared in the literature. It would thus appear that torsion of the spermatic cord has occurred more frequently during recent years, or that the condition is being more generally recognized. We are in accord with Foley(3), who says that torsion of the spermatic cord is not a rare condition, and that it must always be considered in patients complaining of testicular pain.

V. J. O'Conor(4) reported in 1919 that in the 124 cases of torsion of the spermatic cord which had been reported at that time, the condition occurred most frequently just

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1. Wolf, Monroe: Torsion of the Testicle, Am. J. Surg. 57: 483-492 (Sept.) 1942.
2. Ewert, E. E. and Hoffman, H. A.: Torsion of the Spermatic Cord, J. Urol. 51:557-561 (May) 1944.
3. Foley, William J.: Torsion of the Testicle, Am. J. Surg. 70:105-108 (Oct.) 1945.
4. O'Conor, V. J.: (a) Torsion of the Spermatic Cord, Report of 2 Cases and Review of the Literature, Surg., Gynec. & Obst. 29:580-584 (Dec.) 1919; (b) Torsion of the Spermatic Cord, Ibid, 57:242-246 (Aug.) 1933.

before puberty. Abeshouse(5) reviewed the literature through January, 1936, and found that the condition was encountered most often during the first two decades of life. Ewert and Hoffman's review of the literature in 1944 showed that the majority of the 489 cases reported occurred in the middle of the second decade. The condition is thought to be rare before the age of 10 and after the age of 40, although Hinman(6) has recorded a case present at birth, and Wolf writes of one in a 60-year-old man. In 156 cases analyzed by Abeshouse, there were only 24 patients less than 1 year old. He found that torsion occurred about as frequently on the left as on the right side, and about as often in patients with undescended testicles as in those whose testicles were completely descended.

In the cases here reported, the youngest patient was 11 months of age, the oldest, 18 years. Four had torsion of the right cord, two of the left. We have not observed a case occurring in a patient with undescended testicles.

### *Etiology*

While authorities are not in accord as to the etiology, the condition is thought to depend chiefly upon two factors: (1) an abnormal increase in the mobility of the testicle, and (2) a force, either external or internal, causing acute, sudden contracture of the cremasteric muscle. Foley thinks that hypermobility is usually the result of an anomaly in the descent of the testicle; the distal end of the spermatic cord, the epididymis and the testicle become completely surrounded by the tunica vaginalis, and have no attachments except to the base of the scrotum by the remnant of the gubernaculum testis. The type of torsion most often seen is the type which results from a situation of this kind; the testicle and epididymis, *but not the tunica*, are involved. Most rarely is torsion of an extravaginal type seen, in which the twist is outside the tunica, but involves the tunica itself. This is the type that usually occurs in the undescended or intra-abdominal testis.

The high attachment of the tunica allows some of the cremasteric fibers to be inserted inside the vaginal sac; it is thus conceivable that a spasm of the cremaster, particularly when associated with a firm contraction of one group of fibers of the muscle, may cause a rotation of the spermatic cord, testicle, and epididymis, thus resulting in torsion. This theory, advanced by Muschat(7) in 1931, is the one most generally accepted, and explains why the torsion may relieve itself spontaneously in some cases, while in others the spermatic cord may remain twisted because of continued spasm of the muscle.

### *Pathology*

The pathologic picture is that which might be expected in any case where there is acute occlusion of the blood supply. In the early stages congestion and hemorrhage in the testis and epididymis occur; as the process continues, hemorrhagic infarction and aseptic gangrene ensue. As the changes incident to torsion progress, suppuration and atrophy occur, and the testis and epididymis may finally disappear if the torsion is not relieved.

### *Signs and Symptoms*

The occurrence of torsion of the spermatic cord is marked by sudden, severe pain in the testicle, frequently accompanied by nausea and vomiting; the patient may go into shock. Constitutional symptoms are usually mild, however, and often develop late. There is swelling of the testicle and epididymis, with redness of the skin either in the scrotum or in the inguinal region; the edema may be of a brawny type, and frequently the whole scrotum is involved. Sometimes the twist in the cord may be palpated. In our experience, however, the extreme tenderness of the scrotal contents made palpation impossible; these patients would rarely tolerate more than a mere inspection of the area. The epididymis is often found to be rotated to a lateral or anterior position, but since palpation was not possible in our cases, this point has been of no value to us unless the patient was under anesthesia. The scrotal contents are usually retracted upward, particularly on the affected side. The scrotum becomes a globular mass with a characteristic contour; the affected testicle becomes very hard, and may be found just outside the external ring, and there is no enlargement of the mass if the patient cries or strains. The leg on the affected side is held in flexion.

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5. Abeshouse, B. S.: Torsion of the Spermatic Cord; Report of 3 Cases and Review of the Literature, Urol. & Cutan. Rev. 40:699-714 (Oct.) 1936.
6. Hinman, Frank: The Principles and Practice of Urology, Philadelphia, W. B. Saunders Co., 1935.
7. Muschat, Maurice: The Pathological Anatomy of Testicular Torsion; Explanation of Its Mechanism, Surg., Gynec. & Obst. 54:758-763 (May) 1932.

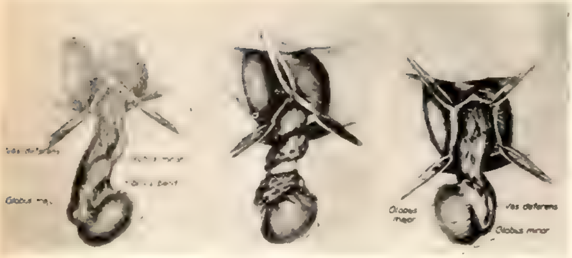

**Fig. 1. Torsion of the spermatic cord: (left) anatomic relations found at operation; (center) twisting of the testicle producing the torsion; (right) surgical method of repair. (After Kreutzmann, H. A. R. and Strauss, B.: Recurrent Torsion of the Spermatic Cord, Urol. & Cutan. Rev. 43:297-299 (May) 1939.)**

The symptoms described above are those usually seen in the acute cases. Subacute and chronic recurring types are also recognized; the development of these depends on the degree of torsion and the time elapsing since the onset.

### *Differential Diagnosis*

The local symptoms and signs of strangulated inguinal hernia may be very similar to those of torsion of the spermatic cord. They usually increase rapidly in severity, however, and the general reaction is likely to be greater. Sometimes both conditions are present at the same time. In any case of doubt, surgical exploration is indicated.

In acute epididymitis, which must also be differentiated from torsion, there is usually a history of symptoms referable to the prostate, urethra, and vas deferens. Prehn's sign(8)—an *increase* in pain on elevation of the testicle—is supposed to rule out epididymitis. In a*cute orchitis* the pain is not severe as in torsion, and the development is more gradual. This statement is true also of *hydrocele* or *hematocele*, in which the scrotum tends to drag downward rather than to retract. Transillumination is possible, provided the fluid in the hematocele is not too bloody. *Tumors of the testicle* are differentiated from torsion by their slow onset and relatively painless character. *Suppurative adenitis* causes more general systemic reaction, and the focus of infection is often demonstrable upon careful survey.

We have not seen a case of *spontaneous hemorrhagic infarct* of the testicle in the newborn. MacLean(9) diagnosed this condition in 2 cases by the presence at birth of an intrascrotal mass of characteristic egg shape, fibro-elastic or stony hard in consistency, together with the presence of ecchymosis of the scrotum and absence of pain or tenderness in the affected testicle. The patients were afebrile, and the laboratory findings were not remarkable.

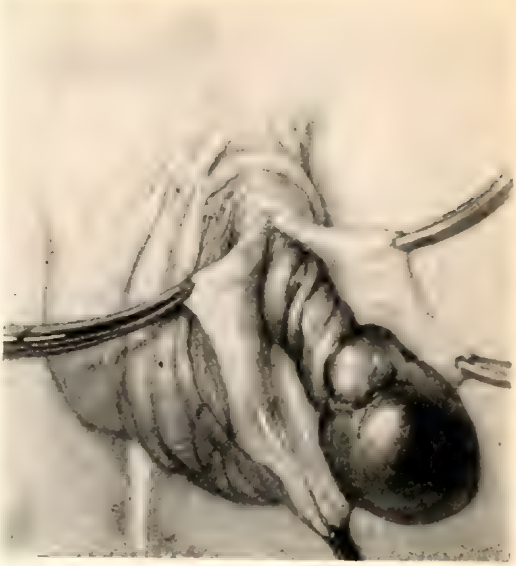

**Fig. 2. Torsion of the spermatic cord. The torsion here is counter-clockwise. (After Dodson(11))**

*Torsion of the appendix testis* (hydatid of Morgagni) may present real difficulty in the differential diagnosis of torsion of the testicle. Vermeulen and Hagerty(10), in reporting 2 cases of torsion of the appendix testis, stated that the symptoms are those of torsion of the cord. Both conditions occur in young adult males. The symptoms are supposedly milder in torsion of the appendix testis, but Vermeulen and Hagerty found this point to be of very little value in their cases. They also stated that their patients had marked erythema and edema of the skin on the affected side; this finding is not supposed to be present in torsion of the appendix testis, and is referred to as a diagnostic point by some authors. We have not observed a case of torsion of the appendix testis, but we do not believe that it is readily distinguishable from torsion of the spermatic cord. Since surgical intervention is indicated in both conditions, we do not believe that much time should be lost in debate

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8. Prehn, D. T.: A New Sign in the Differential Diagnosis between Torsion of the Spermatic Cord and Epididymitis, J. Urol. 32:191-200 (Aug.) 1934.
9. MacLean, John T.: Hemorrhagic Infarct of the Testicle in the Newborn, Surg., Gynec. & Obst. 76:319-322 (March) 1943.
10. Vermeulen, C. W. and Hagerty, C. S.: Torsion of the Appendix Testis (Hydatid of Morgagni): Report of Two Cases with a Study of the Microscopic Anatomy, J. Urol. 54: 459-465 (Nov.) 1945.

as to which structures are involved in the torsion.

### *Treatment*

Dodson[11] states tersely that operation is indicated in all cases. This statement applies also to cases in which there is doubt as to the diagnosis. If the testicle is exposed before permanent irreparable damage has been done, Dodson recommends that the cord be untwisted and the testicle sutured to the bottom of the scrotum. Atrophy of the testicle may occur but is thought to be rarely complete, and we agree with Dodson that most patients prefer some semblance of a testicle to none at all. If there is no return of circulation to the epididymis and testicle after the torsion is reduced and hot packs are applied, orchiectomy should be done. In cases of torsion of an *undescended* testicle, immediate orchiectomy is indicated.

The time element is very important in treatment. In most of our cases the patient was seen by the family doctor, who was called twelve to fourteen hours after the onset of the acute symptoms. By this time the changes secondary to the impaired circulation (which, depending on the degree of torsion, may be pronounced within a very few hours) were so confusing that the whole process was believed to be one of acute inflammation. We wish to repeat that expectant treatment has no place in this condition. Every hour that the torsion is present adds greatly to the chances of complete testicular atrophy later. Unless operation is performed within twelve hours, the degenerative circulatory changes in the testicle and epididymis are usually irreversible; in such cases the only treatment is orchiectomy. We agree with Foley that orchiectomy may be avoided by early diagnosis and the institution of immediate surgery. If this fact can be impressed on the practitioner, the incidence of orchiectomy for torsion of the spermatic cord will be materially reduced.

### *Case Reports*

#### *Case 1*

A white college student, aged 18, was admitted to the hospital complaining of dull, aching pain in the right testicle; this came on gradually the day before admission, and the patient first noticed it while walking to class. An hour later the soreness was considerably worse, and on inspection of his testicle he found it to be swollen. He became nauseated and vomited. The pain gradually extended into his abdomen, to a point just beneath the umbilicus. The pain in his testicle subsided considerably, but the swelling of the scrotum and the pain in the abdomen persisted. There were no urinary symptoms.

Physical examination was essentially negative, except that the patient was in considerable discomfort, lying on his back with his knees supported by a pillow. The right side of the scrotum was hard, enlarged, red, and very tender. The patient's temperature was 99.2 F. Laboratory findings were negative, except for a white cell count of 15,700. The impression of the examiner was epididymitis. It was decided to treat this conservatively, and await developments.

Two days later it became evident that surgical intervention would be necessary; operation was done under spinal anesthesia. The right testicle and epididymis were exposed; both structures were very dark in color, and a definite twist in the spermatic cord was found at the junction of the epididymis and the cord. The cord was normal above this point. The vas deferens was isolated and tied. The venous portion of the cord was doubly ligated, and the usual orchiectomy was done. The wound was closed with one small rubber tissue drain. The postoperative course was uneventful. The patient was discharged thirteen days later; he was afebrile, his wound was healed, and his condition was excellent.

This case emphasizes the importance of early diagnosis; had the diagnosis been made when the patient was admitted to the hospital, it is possible that his testicle could have been saved.

#### *Case 2*

A 14-year-old boy, the son of a physician, noticed some pain and redness of the left testicle upon waking at 6 a.m. on the day before admission. His discomfort and physical findings were not alarming, and conservative therapy, including rest in bed and ice packs, was employed. The next day his left testicle began to swell and became more painful and tender, and he was admitted to the hospital.

Physical examination showed the left testicle to be swollen and red; the examiner thought that there was possible torsion of the spermatic cord. The temperature was 99 F., the blood pressure 130 systolic, 68 diastolic; the urine was negative, and the blood count was not remarkable except for a white cell count of 15,850, with 89 per cent polymorphonuclears.

Operation was performed under avertin and gas anesthesia. When the tunica vaginalis was opened, sero-sanguineous material poured out. The left testicle was twisted two complete turns on the cord; the epididymis and testicle were swollen, ecchymotic, and blue. The distal third of the cord was twisted, and the blood supply was obstructed. After reduction of the torsion, hot packs were applied, and the testicle and cord slowly regained their normal color. The structures were restored to their normal position, and the wound was closed with one small rubber tissue drain. The patient was given sulfathiazole, grains 7½, three times a day. Convalescence was uneventful, and the patient was discharged in good condition five days later.

In this case it is possible that another twist in the cord occurred during the period of time that the patient was being treated by conservative measures. It was fortunate that the blood supply was not completely occluded, and that the structures were not damaged so severely that they could not regain their normal characteristics. This patient has been observed from time to time, and to date the left testicle is apparently normal.

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11. Dodson, Austin I.: Urological Surgery, St. Louis, The C. V. Mosby Co., 1941, pp. 650-653.

### *Case 3*

A child 11 months old was admitted to the hospital after the mother had noticed scrotal edema and reddish discoloration of the left scrotal contents when she bathed the baby on the day of admission. The left testicle was very tender to touch, but when left alone the baby did not appear to have pain. The size of the swelling increased considerably during the period of several hours which elapsed before admission. There was no history of chills or fever.

Physical examination was negative except for swelling and redness over the entire scrotum and induration over the left testicle; the epididymis was not palpable, and no fluid was demonstrable. Laboratory findings were normal, and the patient had no fever. The impression of the examiner was torsion of the left spermatic cord, and it was decided to explore this side immediately.

At operation, which was performed under ether anesthesia, the epididymis and testicle were found to be greatly swollen and considerably discolored. There was a definite twist of the spermatic cord near the head of the epididymis, and several bands of tissue constricted the arterial blood supply at this point. Early gangrene of the epididymis and testicle was present. After releasing the bands and reducing the twist of the testicle, warm packs were applied. The appearance of the testicle improved sufficiently to justify replacement of the scrotal contents into their normal position. The tunica vaginalis was partly closed over the testicle, and the wound was closed in layers without drainage. The patient's temperature varied from 101 to 102.4 F. rectally until the third postoperative day, at which time it returned to normal. The postoperative course was otherwise uneventful, and the child was discharged on the tenth postoperative day in good condition.

This patient was seen before extensive gangrenous changes had taken place, and prompt diagnosis and surgical intervention prevented loss of the testicle.

### *Case 4*

A 13-year-old boy was admitted to the hospital two hours after he had noticed some pain in the right testicle while he was playing at a Scout meeting. Shortly after its onset the pain became quite severe and throbbing. The patient's family doctor observed slight swelling of the right testicle, which by this time had become very tender. He suspected torsion of the spermatic cord and referred the patient to the hospital. It is interesting to note that once in the past the patient had had a similar pain in the left testicle, which came on spontaneously while he was in bed, lasted about four hours, and then disappeared.

Physical examination showed slight redness of the tonsils and some swelling, retraction, and extreme tenderness of the right testicle. The scrotum was of normal color, and there was no tenderness along the right cord. Laboratory findings showed nothing remarkable. It was decided that this was undoubtedly a case of torsion of the right cord, and immediate operation was advised.

The usual incision was made, and a full twist of the spermatic cord in its distal third was found and reduced. The testicle was rather dark, but quickly regained its normal color when the twist was released. It was replaced in the scrotal sac and the wound was closed in the usual manner without drainage.

This is another case in which early surgical intervention probably saved the testicle.

### *Case 5*

A 14-year-old boy came to the hospital three days after striking his scrotum an insignificant blow with his own hand while playing leap frog. There was immediate sharp, stabbing pain, and in fifteen or twenty minutes he noticed generalized swelling of the scrotum, with some redness of the skin and considerable tenderness. This condition became progressively more severe, and at the time of admission the scrotum was about four times its normal size and was so tender that the patient would not tolerate any kind of examination. He had had no chills or fever and no difficulty in voiding. The patient stated that he had fallen over a fence six weeks before and had suffered much the same sort of pain, with slight scrotal swelling. These symptoms disappeared in one or two days.

Physical examination showed the scrotum to be enlarged, reddish-blue in color, and exquisitely tender. While the patient was very cooperative, he was apprehensive about any examination of the genitalia, and it was difficult to tell which testicle was affected. The impression of the examiner was traumatic orchitis on the right, with possible right scrotal abscess. The laboratory findings were not remarkable, and the patient's temperature was 99.2 F. The urologist felt that torsion of the spermatic cord was probable, and advised immediate operation.

Incision was made in the right scrotal area. Much edema and free bleeding were encountered; the testicle was greatly discolored, and the epididymis was black. One complete twist was present in the cord just above the epididymis, and when this was released very little color returned to the parts. Since the testicle and epididymis were considered to be damaged beyond repair, they were removed. The incision was closed in the usual manner with one rubber tissue drain. The patient's temperature went as high as 101.4 F. one day postoperatively; it came down promptly, however, and the patient was discharged in excellent condition seven days later.

In this patient the torsion apparently occluded the arterial supply completely; in the space of three days necrosis had progressed so far that it was necessary to sacrifice the testicle.

### *Case 6*

A 12-year-old boy was admitted to the hospital three or four days after feeling sudden, sharp pain in the right testicle while he was riding a bicycle. There was also some pain in the lower abdomen.

When the family doctor sent the patient to the hospital, physical examination was negative except that the right testicle was drawn up almost to the right external ring and was very hard. No discoloration had occurred, but the testicle was tender. Laboratory findings were negative. A diagnosis of torsion of the right spermatic cord was made, and immediate operative intervention was advised.

The patient was operated upon under avertin, nitrous oxide, and ether anesthesia. The right testicle and epididymis were found to be very much discolored, and two complete twists of the cord were released. After some minutes it was thought that there was some return of color to the parts; the testicle was replaced, the tunica vaginalis was closed, and the wound was closed without drainage.

The patient's temperature remained around 101 F., despite penicillin and sulfadiazine therapy, and his white blood cell count ranged from 8,000 to 14,000. He was seen by a pediatrician, who thought that a mild upper respiratory infection was enough to account for the fever. His temperature gradually subsided, and he was discharged on the ninth postoperative day apparently in good condition, with the incision well healed.

When he was seen five months later, the right testicle was found to be atrophic. It is possible that if the testicle and epididymis had been removed at operation, his postoperative course would have been relatively afebrile.

### *Summary*

The literature on torsion of the spermatic cord is reviewed briefly, and 6 cases seen in Watts Hospital since 1940 are reported.

The importance of early diagnosis and the necessity for prompt surgical intervention are emphasized.

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# THE STERILIZATION OF THE INSANE AND MENTALLY DEFICIENT IN NORTH CAROLINA

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Preventive medicine lacks the visible and tangible appeal of the patient in need. Its accomplishments in health and happiness, however, often far exceed those of the same effort spent at the bedside. In the field of the medical care of the insane and the mentally deficient this statement is strikingly true. A half hour spent in ligating the spermatic or ovarian tubes may eliminate the need of segregating and supervising defective offspring for periods which can amount to the lifetimes of several individuals.

It has been shown repeatedly(1) that tubectomy interferes with no function of the body other than the capacity for parenthood. There is no decrease in sexual activity, and satisfaction in marriage is not diminished. Since the psychic and economic capacities of mentally defective persons are distinctly reduced, protection from the overload entailed in these fields by parenthood is especially valuable and is greatly appreciated by those with sufficient intellect to understand it.

While it is not true, as some propagandists would have us believe, that all children of the insane or feeble-minded will have defective mentalities, it is almost unavoidable that they will be brought up under highly unsatisfactory conditions.

To make the protection of sterilization available to patients in state institutions, laws have been passed by a number of states. The first was put on the statute books in 1907 in Indiana, and today twenty-four states have such laws in active application.

### *Application of North Carolina's Sterilization Law*

North Carolina's sterilization law was passed in 1919. Its wording was not clear, and no operations were performed under the act. A second law, passed in 1929, was declared unconstitutional because it made no provision for appeal to the courts. The present law (Chapter 35, Article 7, Section 35-36 to Section 35-37) was passed in 1933. It provides for a Eugenics Board consisting of the Commissioner of Public Welfare, the Secretary of the State Board of Health, the Chief Medical Officer of the State Hospital at Raleigh, the corresponding official of another state hospital, and the Attorney General. The head of any penal or charitable institution of the state or of any subdivision of such an institution is directed to institute proceedings before the Eugenics Board for sterilization of any mentally diseased, feeble-minded, or epileptic patient who, unless operated on, might have a child with a tendency to serious mental disease or deficiency, when such sterilization would be for the public good. It is also made the duty of each county superintendent of public welfare to institute proceedings for the sterilization of such persons who are not inmates of state institutions.

The Eugenics Board considers the evidence indicating the desirability of the operation and decides whether it falls within the causes specified in the law. The patient, or his parent or guardian, may appeal to the courts should he be dissatisfied with the ruling of the Board.

North Carolina's Eugenics Board, at the end of 1945, reported a total of 1722 sterilizations. For a large proportion of these individuals this operation has meant release from segregation which would not otherwise have been possible. These releases have resulted in a corresponding reduction in the drain on the taxpayer's resources, and have shown the foresightedness of those who passed the law. While this number of sterilizations is a real accomplishment for the state, there are indications that the protec-

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1. Popenoe, Paul: (a) Effect of Salpingectomy on the Sexual Life, Eugenics 1: No. 2 (Nov.) 1928. (b) Eugenic Sterilization in California; Effect of Vasectomy on the Sexual Life, J. Abnorm. Psychol. 24:251-268 (Oct.-Dec.) 1929.

tion of this law might well be carried further.

A North Carolina Committee on the Problem of the Feebleminded⁽²⁾ estimated that 2 per cent of North Carolina's inhabitants fall in this classification. Applying this estimate to the population shown by the 1940 census indicates that there are 71,000 feeble-minded persons in the state. More recently the North Carolina Governor's Commission appointed to study the care of the insane and the mental defectives⁽³⁾ selected a town in the county which they considered most typical of the state. A careful study of its 1188 school children showed that 4.5 per cent were mentally defective. "According to the State Department of Education," the report continues, "there were in the school year, 1934-35, 616,314 white children enrolled in the public schools of North Carolina. Applying the percentage of 4.5 per cent to this number we find 27,734 mental defectives in the state's white school population." Obviously this figure is only a part of the total number of mental defectives. When the adults and Negroes are included, the number would exceed the previous estimate of 71,000. The entire sterilization program under the Eugenics Board, therefore, has touched less than 1 in 41 of the potential parents who are mentally defective.

### *Comparison with Other States*

Comparison with other states is made possible by the statistics collected by the Human Betterment Foundation of California, and more recently by Birthright, Inc., the national organization for education in this field⁽⁴⁾. These statistics show that at the end of 1945, California and Virginia had been the most active states, with 17,835 and 4,958 operations carried out under their sterilization laws. For accurate comparison, however, the relative populations of the states must be taken into account. The numbers of tubectomies per 100,000 population have, therefore, been calculated and are shown in figure 1. Delaware leads, with a rate of 250 operations per 100,000 inhabitants. California has used the procedure nearly as extensively, with a rate of 231. Virginia occupies third place, with a rate of 175. North Carolina, with 45 sterilizations per 100,000 population is the fifteenth state, being preceded by Delaware, California, Virginia, Kansas, Oregon, North Dakota, South Dakota, New Hampshire, Minnesota, Utah, Vermont, Nebraska, Michigan, and Wisconsin.

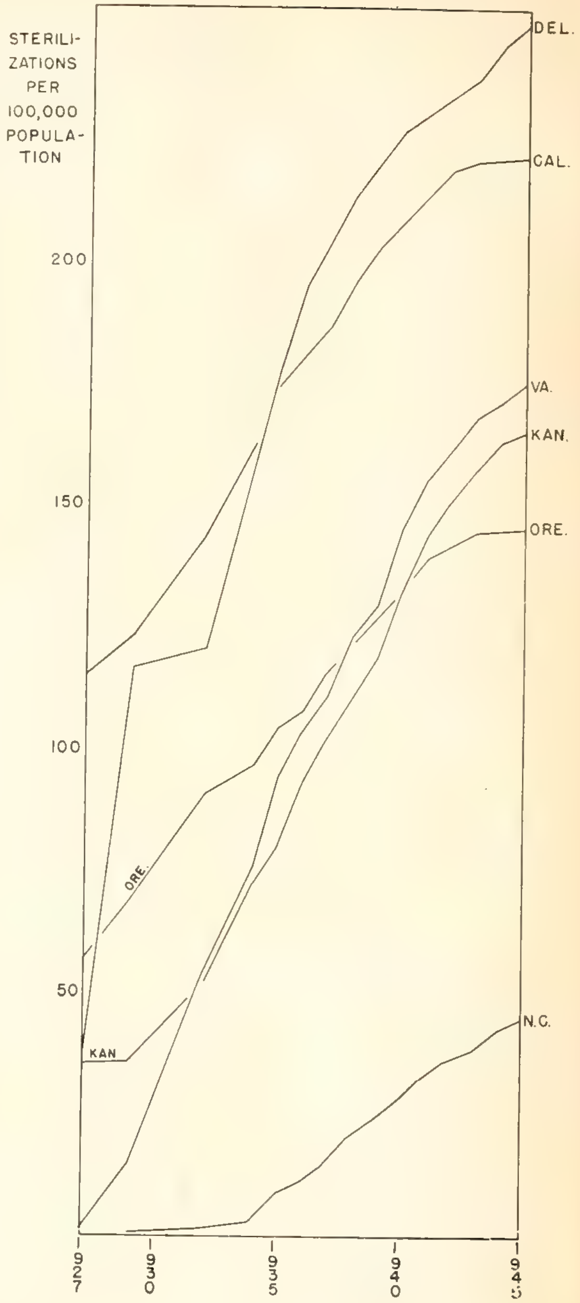

Fig. 1

When we consider only the operations performed in the twelve months of 1945—the last year for which comparative data are available—North Carolina, with a rate of

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2. Report of the Committee on Caswell Training School in Its Relation to the Problem of the Feebleminded of the State of North Carolina, Raleigh, 1926.
3. A Study of Mental Health in North Carolina, Report to the North Carolina Legislature of the Governor's Commission, appointed to study the care of the insane and mental defectives, 1937.
4. Birthright, Incorporated Box 111, Princeton, N. J.

### Table 1

**Sterilizations Reported by State Institutions as Carried Out under the Eugenic Sterilization Laws of the Various States**

Compiled from Reports of the Human Betterment Foundation and Birthright, Inc.*

| *Total Sterilizations to Jan. 1, 1946* | | *Sterilizations per Year* | | | |
|---|---|---|---|---|---|
| *per 100,000 Population** | | *1941-1945 per 100,000 Population** | | *1945 per 100,000 Population** | |
| Del. | 250 | Cal. | 8.6 | Del. | 7.1** |
| Cal. | 231 | Va. | 7.5 | Va. | 6.3 |
| Va. | 175 | Del. | 6.4 | Cal. | 5.7 |
| Kan. | 165 | Utah | 5.8 | N. H. | 4.0 |
| Ore. | 145 | Kan. | 5.4 | Utah | 3.8 |
| N. D. | 113 | N. D. | 5.4 | Ind. | 3.5** |
| S. D. | 107 | Ore. | 4.4 | N. D. | 3.4 |
| N. H. | 105 | Neb. | 4.0 | N. C. | 3.1 |
| Minn. | 75 | N. H. | 4.0 | Ga. | 2.8** |
| Utah | 72 | N. C. | 3.8 | Vt. | 2.2** |
| Vt. | 68 | S. D. | 2.7 | Ore. | 2.1 |
| Neb. | 51 | Ind. | 2.5 | Iowa | 2.0 |
| Mich. | 48 | Iowa | 2.4 | Kan. | 1.8 |
| Wis. | 47 | Wis. | 2.3 | Wis. | 1.8 |
| N. C. | 45 | Minn. | 2.3 | S. D. | 1.6 |
| Ind. | 42 | Ga. | 2.0 | Mich. | 1.6 |
| Wash. | 38 | Mich. | 1.9 | Neb. | 1.3 |
| Mont. | 38 | Vt. | 1.6 | Minn. | 0.4 |
| Conn. | 28 | Mont. | 1.0 | Miss. | 0.4 |
| Miss. | 26 | Conn. | 0.8 | Mont. | 0.4 |
| Maine | 25 | Maine | 0.7 | Maine | 0.2 |
| Iowa | 25 | Okla. | 0.6 | Conn. | 0.1 |
| Okla. | 24 | S. C. | 0.4 | | |
| Ga. | 14 | Miss. | 0.4 | | |
| Ala. | 8 | | | | |
| S. C. | 4 | | | | |
| Ariz. | 4 | | | | |
| Idaho | 3 | | | | |
| W. Va. | 2 | | | | |

* Population extrapolated from 1930 and 1940 censuses.
** 1945 rate greater than 1941-1945.

3.1 per 100,000, is higher on the scale, occupying eighth place. The state is preceded by Delaware, with 7.1; Virginia, 6.3; California, 5.7; Vermont, 4.0; Utah, 3.8; Indiana, 3.5; and North Dakota, 3.4.

That the larger numbers of persons considered suitable candidates for sterilization in other states are not due to higher proportions of mental deficiency is suggested by the findings of the Selective Service(5). In an extensive sampling, the proportion of rejections among selectees was found to be higher in North Carolina than in any other state. The most frequent cause for rejection was mental impairment.

The favorable accomplishments of a sterilization program are shown by Butler(6), who estimates that for the Sonoma State School in California alone it has resulted in an annual saving of $650,000, with a corresponding increase in freedom for former inmates.

The continued and effective use of sterilization in a greater degree by other states suggests that North Carolina might well apply the procedure more extensively for the protection of its present and future generations.

### *The Physician's Responsibility*

It may seem that this prophylactic measure is of little concern to the average physician, who treats few mental cases and none which are under state control. Indirectly, however, there is much that he can do to assure the more widespread use of this beneficial measure. The physician understands that tubectomy is not a mutilating operation. The layman, however, acquainted only with castration, the veterinary form of sterilization, fears complete loss of sexual powers and suffers vicariously at the thought of the sterilization of relatives or fellow citizens. If every doctor in the state would see that his patients understand what is so obvious to him, superintendents of state institutions and of county welfare agencies, who must reflect public opinion, would have much less hesitancy in recommending the operation in appropriate cases. What is even more important—since the law is seldom enforced if the patient or his parents object—, consent would be much more readily obtained.

### *Conclusions*

North Carolina's law permitting sterilization of the insane or mentally deficient has been applied to 1722 individuals, or 45 per 100,000 population.

Since this number represents less than 1 in 41 of the mentally deficient population of the state, and since other states have found it desirable to use the operation in a much greater proportion of cases, this prophylactic measure might well be more extensively applied in North Carolina.

Each physician in the state can help make this more widespread application possible by letting his patients know that, except for the impossibility of parenthood, sterilization involves no change in sexual functions or characteristics.

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5. Physical Examination of Selective Service Registrants During Wartime, April, 1942 December, 1943, Medical Statistics Bulletin No. 3, National Headquarters, Selective Service System, Washington, D. C., 1944.
6. Butler, F. O.: A Quarter of a Century's Experience in Sterilization of Mental Defectives in California, Am. J. Ment. Deficiency 49:508-513 (April) 1945.

# SOME FACTORS CONCERNING STERILIZATION BASED UPON A STUDY IN ORANGE COUNTY, NORTH CAROLINA

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Chapel Hill

During the summer of 1945 the State Eugenics Board began a study in Orange County in an effort to find out as specifically as possible the extent of mental disease and mental deficiency in a fairly typical North Carolina county, and to secure as many pertinent data as might be available on each individual classified as mentally ill or mentally defective. Although the Eugenics Board, by reason of its official duties, is particularly interested in securing information bearing directly upon sterilization, it is also concerned with the total problem of the mentally diseased and the mentally deficient. It is hoped, therefore, that the Orange County study will bring to light several factors applicable both to the problem as a whole and to the program of sterilization, which is such an important part of any well balanced plan for the treatment and prevention of mental disease and mental defect.

At the outset, it must be stated that the study is by no means completed, and even though it is expected that a report of findings will be submitted in June, there is still much that could be done in the matter of securing additional data from many and various sources which have presented themselves. At this time, however, it is possible to present some of the principal findings indicated by the data already at hand.

The present population of Orange County is approximately 24,000. If the ten most populous of the state's one hundred counties are excluded, Orange would be about average for all the rest in regard to many criteria, such as population, Negro-white ratio, per capita wealth, farm and industry, and taxable wealth.

The study has attempted to gather recorded data on individuals who have been declared by presumably competent authorities to be either mentally diseased or mentally deficient. The records consulted include those of the Eugenics Board, the Division of Psychiatric and Psychological Services of the State Board of Public Welfare, the commitments of the Clerk of the Superior Court to the State Hospitals, the State Hospitals, Caswell Training School, Selective Service Board, Public School Group Mental Tests, the Department of Public Health, the Department of Public Welfare, and the Emergency Relief Administration of Orange County.

## *Selective Service Rejections*

A study of the Selective Service records shows that up to August, 1945, approximately 6,000 men between the ages of 18 and 38 had been registered in Orange County. Of these, 2,431 were accepted for military service, 1,460 were rejected, and the remainder, about 2,100, were deferred for various reasons. Of the 1,460 rejections, 622, or 42.3 per cent, were for some sort of mental impairment. The diagnoses in these 622 cases were as follows:

| | *No.* | *Per Cent* |
|---|---|---|
| Mental deficiency or borderline | 357 | 57 |
| Psychoneurosis | 154 | 25 |
| Constitutional psychopathic state | 67 | 11 |
| Epilepsy | 28 | 4½ |
| Mental disease | 16 | 2½ |

It will be noted that 57 per cent of all the rejections on a mental basis were for mental subnormality. This figure may be too high, because 133 of the 357 were rejected on the grounds that they failed "to meet minimum intelligence standards." It is understood that this classification was often used at the induction centers when the primary cause for rejections was really illiteracy. Also because of various changes in regulations and quotas, the standards for acceptance into military service have not been consistently uniform. On the other hand, it is known that a considerable number of men accepted for military service subsequently failed to meet the test and had to be discharged. Unfortunately for the study, it was impracticable to secure data on those so discharged. In view of this factor it is possible that the number listed as mentally ill or defective is actually a minimum; this possibility is strengthened by the fact that, in men rejected for some obvious physical disability, the mental condition was often not seriously considered.

Since a typical characteristic of the mental defective is inability to meet the demands

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* Field Secretary, North Carolina Eugenics Board.

of everyday living, it is not surprising that 167, or almost 47 per cent, of the 357 rejectees classified as mentally subnormal were members of families who have been clients of the County Department of Public Welfare. One hundred thirty-four, or 38 per cent, had court records.

Later the Eugenics Board plans to analyze the Selective Service data concerning the psychoneurotics, the constitutional psychopathics, the epileptics, and the mentally diseased.

### *Data from Other Sources*

Thus far, data have been compiled, from the several other sources previously mentioned, on 336 individuals between 18 and 38, exclusive of the Selective Service Board rejectees. Of this number there are 233 definitely classifiable as mental defectives, 88 as mentally diseased, and 15 who have been sterilized because of physical defects, on the recommendation of the Department of Public Welfare. Thirty-three others out of the total of 336 have been sterilized under the authority of the Eugenics Board.

The group testing of all elementary school children in the county is still in process. Of the 2,900 thus far tested, 439—slightly more than 15 per cent—were found to have an intelligence quotient below 70. One hundred and eleven, or 3.8 per cent, had an I.Q. of 60 or less. These figures do not take into account the number of children absent on the days of testing, or not attending school because of mental deficiency. Obviously, not all of the school children with an I.Q. below 70 would be classified as feebleminded if individual tests were made. At this stage of incomplete analysis, however, it appears probable that the results will confirm those of a study made of approximately 2000 school children in another North Carolina county in 1937, which indicated a higher proportion of mental defectives than had been shown in similar studies in other sections of the nation(1). It is realized that the validity of the school tests as applied to Negroes may be questioned, as the tests were developed and standardized chiefly upon the basis of white children.

### *The Problem of Mental Deficiency*

Although the findings of the study do not minimize the problems of the psychoneurotic, the constitutional psychopathic, and the psychotic groups of the population, they do emphasize the immensity of the problem of the mental defectives, who, though a less spectacular group, constitute a tremendous burden upon society. The results of the study thus far clearly indicate that mental defectives tend to have large families, several members within the family group often being affected; that their economic status is usually low, and their physical health poor. The incidence of court cases and of dependence upon public relief is high among this group. The proportion of mental defectives is higher among rural than among urban dwellers, and higher among Negroes than in the white population.

### *North Carolina's Sterilization Law and the Medical Profession*

North Carolina has a good and workable sterilization law; it applies only to the mentally diseased, the feebleminded, and the epileptics. The Eugenics Board is conservative in its consideration of the cases officially brought before it, and the required procedures are as careful as can possibly be devised. Almost all cases coming to the attention of the Eugenics Board are by consent of the patient or the next of kin. The county superintendent of public welfare is the official petitioner for cases referred by the county; the initiation of proceedings in the case of an inmate of a state institution is the responsibility of the institutional head. Sterilization for physical defects is not governed by legislation, and therefore is left entirely in the hands of members of the medical profession. The law itself contains the following provisions(2):

> "Nothing contained in this act shall be construed so as to prevent the medical or surgical treatment for sound therapeutic reasons of any person in this state by a physician or surgeon licensed in this state, which treatment may incidentally involve the nullification or destruction of the reproductive functions."
>
> "That nothing in this act shall, in any way, interfere with any surgeon in the removal of diseased pathological tissue from any patient."

It has been the experience of several public welfare workers that a considerable number of the mentally defectives and their close kinsmen would be favorable to the idea of sterilization if they understood the medical implications. Practitioners of medicine are

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1. A Study of Negro and White Pupils in Piedmont North Carolina, Special Bulletin No. 16, North Carolina State Board of Public Welfare, 1938.

2. North Carolina Sterilization Law, 35:52; 35:56.

certainly in a much better position than public welfare workers to provide an acceptable explanation of the different types of operations and their effects, especially in the matter of distinguishing between castration and sterilization. Would it not be a wise and humane undertaking for physicians and surgeons to explain the procedure and urge sterilization for their mentally defective patients? It is a rather simple matter for the doctor then to refer such patients to the superintendent of public welfare.

In one of the case studies in Orange County is found the following statement by a local physician:

> "Mrs. X., who is 24 years old, has given birth to eleven children, of whom four are living. The first and last were stillbirths. Live twins and triplets were born in less than one year. Six children were born in about one year and nine months.
>
> "The economic status is such that it is difficult to feed and clothe the four living ones. Both mother and father are mentally sub-normal.
>
> "In my opinion a sterilization operation would accomplish definite good."

One wonders why this physician had taken no earlier action, especially since he had attended the previous births. Actually, his statement was given at the request of the Public Welfare Department, which had been called upon for emergency hospitalization for Mrs. X.

### *Conclusion*

In spite of the findings of the Orange County study, the Eugenics Board has no intention of advocating a wholesale program of sterilization. It is believed that much good can be accomplished, however, by greater enlightenment of the public, and by the increased use of the existing channels for sterilization. Surely sterilization is an exceedingly important part of any well rounded program for combatting the problems of mental deficiency and mental disease.

**Rehabilitation of the psychoneurotic patient**, whatever the source of the neurosis, is specifically a medical problem. Although the medical man is burdened with social and professional responsibilities, out of this war he is to inherit broader problems which heretofore he has almost been able to avoid. It is not sufficient to treat the physical ailments of our patients; we are now to realize our full responsibility in treating their emotional problems as well. Since the physician is the only individual trained to understand physiologic and emotional disturbances he is the natural choice for this study. Failure to recognize and accept this responsibility is likely to bring the profession face to face with serious disapproval on the part of lay critics.—John D. Campbell: Everyday Psychiatry, Philadelphia, Lippincott, 1945, p. 311.

# AGLOSSIA CONGENITA

## *Report of a Case without Other Congenital Malformations*

R. K. FARRINGTON, M.D.

THOMASVILLE

Aglossia, or complete congenital absence of the tongue, is extremely rare. The first case was reported by de Jussieu in 1770. The second case was reported by Spiller about 1816. These seem to be the only authentic cases of congenital absence of the tongue without other abnormalities that have been reported in the medical literature(1). To these I wish to add a third case.

### *Case Report*

J.F.T. was born October 10, 1924. Delivery was normal, and the baby weighed 10 pounds at birth. A short while after delivery it was noted that the baby could not open his mouth, and cried as if he had something in it. The attending physician, Dr. Charles H. Phillips, found that a fibrous band about 2 mm. in diameter, extending from the floor of the mouth to the back part of the hard palate, prevented the mouth from being opened. This band was severed without bleeding, and it was immediately noted that the baby did not have a tongue.

The baby was fed with a spoon, and was able to swallow normally without strangling. In a few days he learned to nurse a bottle with a soft nipple. In the act of nursing, the cheeks went in and out like a pair of bellows. The baby soon began to vomit a great deal; the description given by his mother suggests pyloric stenosis. At the age of 6 months he weighed only 6 pounds, but after that he began to improve and to develop normally. He did not walk until he was 2 years old.

The patient had bronchial pneumonia once a year for the first three years of life. He had the usual diseases of childhood, but no serious illness after the age of 3. The dentition of the deciduous teeth was perfectly normal, but the permanent teeth were small and irregular and began to decay very early, some of them showing decay when they erupted. Within the past year all teeth have been extracted and plates are worn satisfactorily.

The father is now 57 and the mother 46. The patient has two sisters, aged 24 and 13 years. All these members of his family are living and well, and all are normal.

When I examined the patient at the age of 20, he was 71 inches tall and weighed 148 pounds. He was well developed and well nourished. The general physical examination was entirely negative, except for the structures in and around the mouth. The face appeared very sharp and narrow below the superior maxillary bones, and the chin was somewhat receding (fig. 1). When the mouth was opened (fig. 2), marked hypertrophy of the submaxillary and sublingual glands was noted. The sublingual ridges were very prominent and appeared to be hypertrophied. The throat seemed to be round; looking down it was like looking down a tube with a notch in the bottom, through which the epiglottis

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1. Rosenthal, Robert: Aglossia Congenita: Report of a Case of the Condition Combined with Other Congenital Malformations, Am. J. Dis. Child. 44:383-389 (Aug.) 1932.

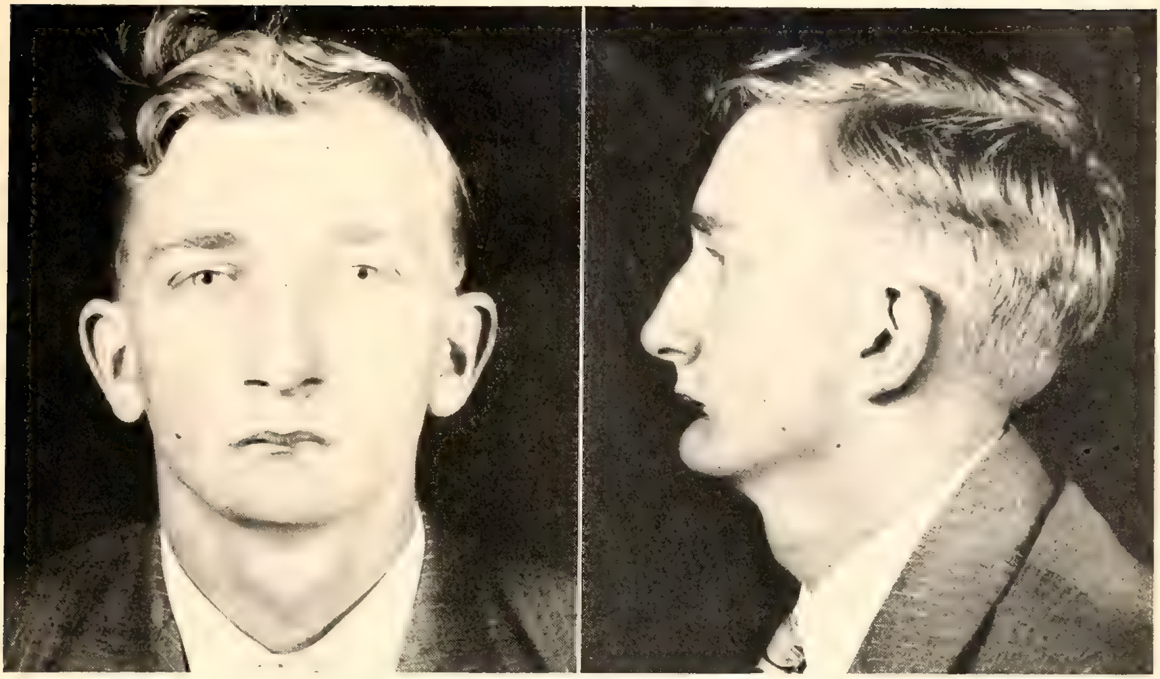

Fig. 1. Front and side views of the patient with his dentures removed.

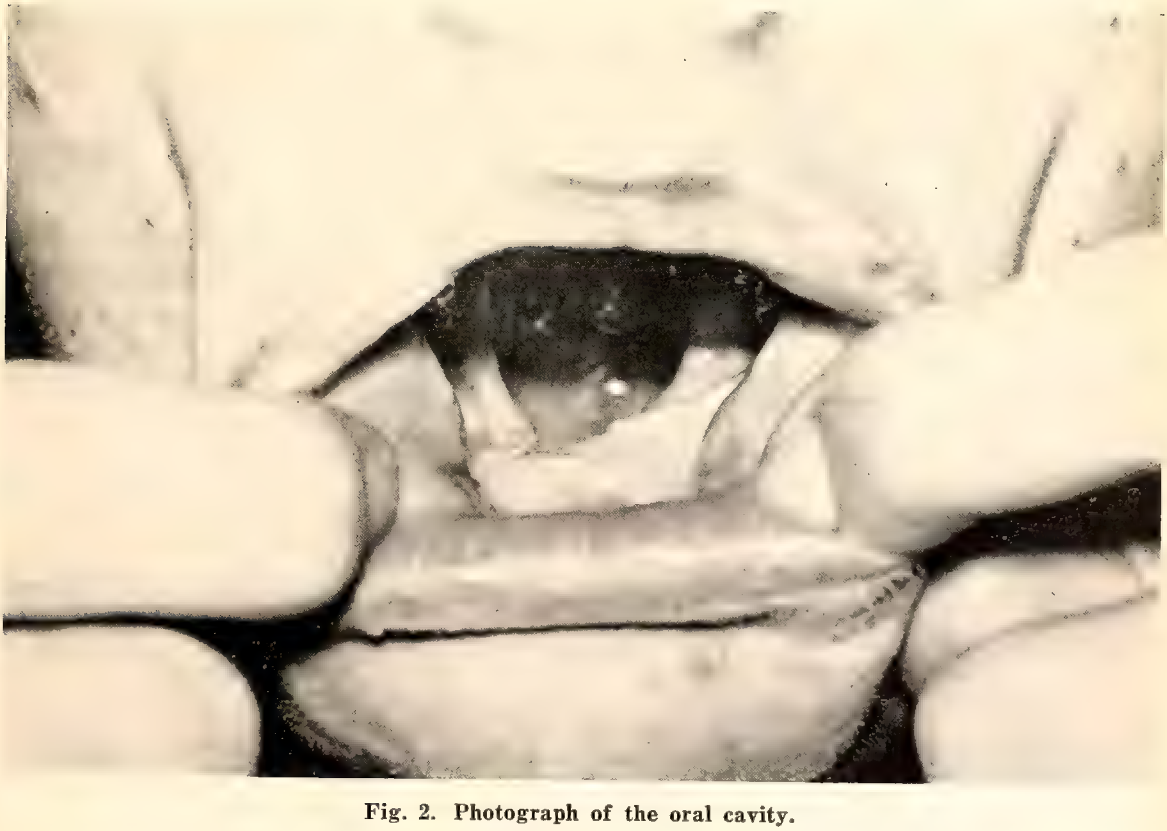

Fig. 2. Photograph of the oral cavity.

could be seen. There was no vestige of a tongue and no other masses, muscular or otherwise, which would suggest even the rudiment of a tongue. The tissue in front of the epiglottis was whitish-grey, and had the appearance of scar tissue. No vestige of the fibrous band which was cut at birth remained. The tonsils were present and normal. The uvula was present, but was rather short.

On examination of the neck, the hyoid bone appeared to be perfectly normal, but both the hyoid bone and the larynx seemed to be somewhat higher than they should be, and the larynx was flattened and wider than normal.

This boy is able to chew normally with a rotary motion of the lower jaw; occasionally he has to use his finger to shift a bolus of food from side to side, but he never uses the finger to aid in swallowing. His speech is fairly normal. The only letter of the alphabet with which he has any difficulty is the letter "Q"; this sounds like "to." His sense of taste is not impaired.

### *Comment*

Although this is only the third case of complete aglossia congenita without other congenital malformations to be reported in the literature, patients whose tongue has been amputated because of malignancy or has been lost by gangrene from smallpox have been observed more frequently. In these cases the speech development has been much the same as in the case reported above. The sense of taste has not been impaired in any of the reported cases of complete aglossia congenita.

I am indebted to Mr. Robert D. Little of Duke University for making photographs of this patient.

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## THE TREATMENT OF ACUTE ANTERIOR POLIOMYELITIS

Robert B. Lawson, M.D.

Winston-Salem

During the past few years numerous articles in the scientific literature have discussed the relative merits of the "Kenny" treatment of poliomyelitis and the vaguely defined "orthodox" treatment. At the same time a nation-wide press campaign, and now an extraordinary moving picture, have been devoted to glorifying this apparently revolutionary "Kenny" treatment.

In order to clarify our ideas so that we can better evaluate therapeutic results, it is desirable to review the available literature on this subject. This paper presents the results of such a review, together with personal observations on the present methods of treatment for poliomyelitis.

Over the period of the last thirty-odd years, numerous methods of treatment have been recommended and then dropped as time has shown that the apparent good results from each have been fortuitous. The most striking example of this unwarranted enthusiasm was in the use of convalescent serum. For a few years in the early 'thirties it was considered mandatory to give convalescent serum to patients with so-called "pre-paralytic" poliomyelitis. Uncontrolled studies on the use of convalescent serum had created the fixed impression that paralysis could be prevented if serum was given early in the disease. As the popularity of serum grew, many physicians did not dare to omit the use of serum, even though there was no convincing proof of its value. It was not until carefully controlled studies were carried out by giving serum to alternate patients that this method of therapy was shown to have no value. Despite these studies, convalescent serum is still being given in many centers with the idea that at least no harm will result. Other specific therapeutic agents, such as Rosenow's horse serum, have also been tried and found wanting. The newer chemotherapeutic and antibiotic agents, such as the sulfonamides and penicillin, have all proved to have no effect on the poliomyelitis.

It is easy to see why specific sero-therapy has been unsuccessful when we consider the intracellular site of virus proliferation, which gives added protection to the virus. The quest for a therapeutic agent will go on, however, and almost surely will be rewarded by ultimate success.

In our present state of ignorance the treatment of poliomyelitis resolves itself around non-specific measures aimed at making the patient more comfortable, limiting spasm and contractures of the muscles, muscle re-education, and the correction of existing deformities. This last aim is a purely orthopedic problem which does not fall into the scope of this paper.

### *Theoretical Basis of Treatment*

Although the exact pathways taken by the poliomyelitis virus are not completely understood, it is accepted by almost all workers in this field that the main effect of the virus is on the anterior horn cell. Some of the cells may be destroyed completely, others may be

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From the Department of Pediatrics, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina.

temporarily knocked out, and many may escape damage completely. It is the number and location of the cells destroyed which determine the degree of final paralysis. Pathologic studies in experimental animals (monkeys and chimpanzees) have shown that extensive neuronal destruction may occur without paralysis, presumably because the number of neurons destroyed in any one area is insufficient to cause detectable paralysis of the muscles served by that area. On the other hand, destruction of a limited number of neurons in one small area of the cord, if there are not sufficient surviving neurons in that area, may cause paralysis of the muscle group served.

The reason for muscle spasm is not clearly understood. Recent evidence indicates that it is due to the effect of the virus on the higher neuron centers. It is very doubtful that it is due to the direct action of the virus on the muscles, but there may be an indirect mechanism, as yet unexplained, that does play a role.

Although there is disagreement about some of the details of the theory given above, the only flat contradiction of it has come from Miss Kenny and her main co-worker in this country, Dr. Pohl(1). Miss Kenny, who used to say that there was no such thing as paralysis due to nerve destruction, now admits that nerve cells can be destroyed, but states that this destruction is secondary to disease in the peripheral structures, including the skin, subcutaneous tissues, fascia, and muscles. She believes that paralysis results from the spasm in the muscles, and from physiologic interference with nerve impulses—her so-called "mental alienation" and "incoordination." Although there is much to disprove her hypothesis, this fact is of little importance in evaluating therapeutic results. Even if we agreed with Dr. Pohl that the results of Miss Kenny's treatment are "far superior" to the results of others, we would not have to accept his rather naive conclusion that her theory of the pathogenesis of the disease is therefore more reasonable(2).

### *Comparison of the Kenny and Orthodox Methods of Treatment*

It is not necessary to dwell on Sister Kenny's claims of originality. It is quite true that her theories are original, but it is also true that they are not accepted. It has been pointed out that all of her therapeutic measures of positioning in bed, hot applications, and early muscle reeducation have been described before and used extensively in one clinic or another. It is not fair to Miss Kenny, however, to claim that nothing is new in her scheme of treatment, for it is undeniable that these methods had given way in recent years to prolonged immobilization in splints or casts, followed by late muscle reeducation. A few people never adopted the use of casts and extensive splinting, but the majority had done so before Miss Kenny's appearance. Now very little of this type of immobilization is being practiced.

**Table 1**

| | |
|---|---|
| **Acute Febrile Stage (3-5 days):** | |
| Key: | Absolute rest; no exercises or physiotherapy. |
| Kenny: | Absolute rest; hot packs; passive motion; no muscle examination. |
| **Stage of Tenderness and Contracture (3 weeks-3 months)** | |
| Key: | Immobilization of paralyzed muscles in casts or splints; no active motion; respirator. |
| Kenny: | Hot packs; muscle reeducation; no respirator; patient flat in bed with footboard. |
| **Convalescent Stage:** | |
| Key: | Muscle training; radiant heat; massage; corrective appliances for contractures; underwater exercises. |
| Kenny: | Muscle training; tendon stretching; hot packs for contractures; no swimming or bicycling. |
| **Chronic Stage:** | |
| Key: | Correction of deformities by muscle transplants and stabilization; braces. |
| Kenny: | Operations and braces—rarely. |

Table I presents a comparison of the Kenny treatment(1) and the method of therapy outlined by Key(3) of St. Louis—an example of the "orthodox" treatment. When these two approaches to therapy are compared, it is apparent that there is much more similarity than dissimilarity. Both Dr. Key and Sister Kenny insist on absolute rest

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1. Pohl, J. F., and Kenny, E.: The Kenny Concept of Infantile Paralysis and Its Treatment, Minneapolis, Bruce Publishing Co., 1943.
2. Pohl, J. F.: The Kenny Concept and Treatment of Infantile Paralysis, Journal-Lancet 65:265-271 (Aug.) 1945.
3. Key, J. A.: Reasons Why the Orthodox Is Better than the Kenny Treatment of Poliomyelitis, Surg., Gynec. & Obst. 77:389-396 (Oct.) 1943.

Table 2

**Anterior Poliomyelitis: Mortality and Recovery Statistics**

| | | | | | *Degree of Recovery in Living Cases* | |
|---|---|---|---|---|---|---|
| *Year* | *Author* | *Location* | *No. Cases* | *Mortality* | *Complete to Good* | *Fair to Poor* |
| 1916 | Ogilvy(5) | Brooklyn | 110 | 17.3% | 85.0% | 15.0% |
| 1932 | Henry(6) | Philadelphia | 605 | 13.2% | 67.0% | 33.0% |
| 1934 | Meals and Hauser(7) | Los Angeles | 1800 | | 80.0% | 20.0% |
| 1937 | Hamilton(8) | Australia | 252 | 1.0% | 72.0% | 28.0% |
| 1941 | Donovan and Bowman(9) | Manitoba | 966 | 1.8% | | |
| 1941 | Adamson and Dubo(10) | Manitoba | 408 | | 85.3% | 14.7% |
| 1941 | Lenhard(11) | Maryland | 296 | 3.0% | 82.0% | 18.0% |
| 1943 | Sherman(12) | Chicago | 70 | 8.6% | 79.0% | 21.0% |
| 1940-44 | **Pohl(2)** | **Kenny Institute** | 364 | 6.3% | 84.0% | 16.0% |
| 1944 | Roper(13) | Virginia | 826 | 8.0% | 78.7% | 21.3% |
| 1944 | Board of Health(14) | North Carolina | 878 | 4.8% | | |

in the early period. In the stage of tenderness and contracture, casts and splints are used to obtain immobilization in the one method; in the other the splints are replaced by carefully controlled positioning in bed, and almost complete immobilization is obtained by bulky hot packs. The methods of muscle reeducation are very similar in both systems, although it is begun earlier by Miss Kenny.

The chief differences are that muscle reeducation, including passive motion of the extremities, is started earlier in the Kenny program; that immobilization is much more complete in Dr. Key's method; and that Miss Kenny treats contractures by application of heat and tendon stretching rather than by corrective appliances. There are many minor variations in the technique of treatment, of course, but it does not seem that many of them are important. Many different methods of treatment between these two extremes have been used over the past thirty years. Some men, such as Toomey(4) in Cleveland, carried out a program of treatment very similar to Miss Kenny's for years before her advent. At the present time most medical centers have adopted treatment schemes which are very similar to the approved Kenny method.

### *Comparison of the Results of Treatment*

It is of interest to compare, if possible, the results of treatment by these various methods. One cannot be dogmatic about such a comparison, for each investigator has a different method of evaluating results. However, a review of all the available articles which include specific figures shows the therapeutic results listed in table 2. Mortality rates over the past thirty years have varied and there has been some variation in end results, but there appears to be no really significant difference in results obtained by the various methods. Evaluation of these statistics is made difficult by the lack of reference standards, and especially by the fact that there is no way of knowing how many of the patients in each series were never paralyzed. It is well known that 40 per cent to 80 per cent of patients with poliomyelitis never show paralysis regardless of the treatment, and therefore can hardly be considered as "cures." Miss Kenny will not allow muscle examinations at the onset of illness, however, and therefore claims all her patients who are not permanently paralyzed as cures.

The widely publicized figures of 87.4 per cent recoveries with the Kenny treatment against 13 per cent recoveries with orthodox treatment are little short of fraudulent(15). Miss Kenny's figures are without reference to the presence or absence of paralysis at the onset, whereas McCarroll's figures are based on patients hospitalized because of

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4. Toomey, J. A.: The Early Treatment of Poliomyelitis, J. Pediat. 21:353-373 (Sept.) 1942.
5. Ogilvy, C.: A Report of a Group of One Hundred and Ten Cases of Poliomyelitis, J.A.M.A. 69:691 (Sept. 1) 1917.
6. Henry, J. N. and Johnson, G. E.: Acute Anterior Poliomyelitis in Philadelphia, J.A.M.A. 103:94-100 (July 14) 1934.
7. Meals, R. W., Hauser, V. F., and Bower, A. G.: Poliomyelitis—The Los Angeles Epidemic of 1934, Calif. & West. Med. 43:123 (Aug.); 215 (Sept.) 1935.
8. Hamilton, D. G.: Acute Anterior Poliomyelitis; A Review of 250 Cases in Sydney During the 1937-38 Epidemic, M. J. Australia 1:148-156 (Feb. 3) 1940.
9. Donovan, C. R. and Bowman, M.: Some Epidemiological Features of Poliomyelitis and Encephalitis, Canad. Pub. Health J. 33:246-257 (June) 1942.
10. Adamson, J. D. and Dubo, S.: A Clinical Study of Acute Poliomyelitis, Manitoba, 1941, Canad. Pub. Health J. 33: 259-274 (June) 1942.
11. Lenhard, R. E.: The Results of Poliomyelitis in Baltimore, J. Bone & Joint Surg. 25:132-141 (Jan.) 1943.
12. Sherman, M. S.: The Natural Course of Poliomyelitis, J.A.M.A. 125:99-102 (May 13) 1944.
13. Roper, L. J.: Observations on the 1944 Epidemic of Poliomyelitis in Virginia, South. M. J. 39:344-352 (April) 1946.
14. Personal communication.
15. Kenny, E.: Poliomyelitis: Contrast Between the Kenny and Orthodox Concepts with Results of Treatment, J. Mich. State M. Soc. 43:673 (Aug.) 1944.

residual paralysis[16]. It is obvious that one cannot compare two such series of patients. When all types of patients with poliomyelitis are included, other investigators have reported even better mortality rates and approximately the same recovery rates as those from the Kenny Institute.

It is apparent that the first fairly satisfactory statistics from the Kenny Institute fail to prove any superiority for this method of therapy. I for one, however, would not go back to the period of long immobilization in casts. Dr. Pohl is very enthusiastic about the lack of deformities and the improvement of body mechanics in patients treated by the Kenny method, and I have the impression from seeing some of these patients that he is right. It is impossible to agree with Miss Kenny's pseudoscientific reasoning, but it does seem that her method of treatment is more comfortable for the patients and probably makes the recovery of muscle function easier, since the peripheral tissues are kept in a better state of tone. Along with a fanatical devotion to their mentor, her technicians have acquired an extraordinary skill in muscle reeducation, and there is little doubt that their patients do obtain a maximum of functional efficiency.

### *Recent Developments in Therapy*

The only other new development in therapy during the past few years has been the use of prostigmine and curare for the relief of muscle spasm. The latter is too dangerous to use at the present time, although it does warrant further study. The value of prostigmine is not well proven. Many well controlled studies will have to be made before we can assess the worth of either of these drugs.

### *Conclusion*

In conclusion, we must agree that the Kenny treatment is not the "atomic bomb" she claims. Statistically there is no proof of superiority as yet, and there is no evidence, nor suggestion of evidence, that the early use of the Kenny treatment will prevent the development of paralysis. Our clinical impression is, however, that the end results in patients treated by her method are better than in those treated with prolonged immobilization. I believe that most of these good results are due to the improvement in the patient's general condition and to the meticulous and prolonged muscle reeducation, rather than to any fundamental difference in her conception of the disease. Fortunately most children with poliomyelitis will escape paralysis regardless of the method of treatment employed, and even those who are paralyzed will improve if treated over long periods of time by experienced personnel.

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## THE IMPORTANCE OF THE pH IN THE TREATMENT OF DISEASES OF THE VAGINA

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BURLINGTON

For years I have used lactose capsules in the treatment of vaginal infections when all other methods failed. In a large percentage of cases where the *p*H of the vagina was high, this method of treatment gave satisfactory results. In the more resistant cases Lactobacillus bulgaricus, which is a close cousin of the Doderlein bacillus, was added to the lactose capsule in the form of Bu-Tabs (Hynson, Westcott, and Dunning).

In most cases this treatment produced a rapid fall in the *p*H, but in a few cases the fall was not permanent. The lactobacilli seemed to die. They were cultured in sterile milk and lactose to increase their vitality and to multiply their number, but this method gave no better results than those following the use of the Bu-Tab. It was felt that the explanation was to be found in the vaginal mucosa, and accordingly, stilbestrol was given by mouth in conjunction with the Bu-lactose capsules by vagina. This combination seems to reduce the *p*H satisfactorily even in the most resistant cases.

### *Method of Treatment*

Stilbestrol is given in doses of 0.5 mg. daily for two weeks. After an interval of a week this treatment is repeated. Twice a week a Bu-Tab in an 8-Gm. capsule filled with lactose is inserted, large end foremost, high up in the vagina. Coating the capsule with KY jelly or slightly moistening (not wetting) it with water will make the insertion easier. A sanitary napkin should be worn for a day to catch any lactose that might escape. This self-treatment in the home is simple and easy. The capsules should

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16. McCarroll, H. R. and Crego, C. H. Jr.: An Evaluation of Physiotherapy in the Early Treatment of Anterior Poliomyelitis, J. Bone & Joint Surg. 23:851-861 (Oct.) 1941.

be kept in a glass jar in the refrigerator. The treatment should be continued for a month or more after apparent cure.

The Bu-lactose treatment is most effective in cases where the vaginal *p*H is high. For determining the *p*H of the vagina, *p*H paper, a virgin speculum, and uterine forceps are used. The instruments should not be sterilized with a disinfectant, as it may affect the test. The test paper is pressed against the vaginal wall and is then compared with the color chart.

### *Case Reports*

The cases reported below illustrate the different conditions in which this method of treatment has been effective.

#### *Case 1*

Mrs. C. R., a healthy, 35-year-old woman, the mother of four children, had been treated for years for a rather profuse and troublesome vaginal discharge, without permanent relief. When she came to me, I mopped the vaginal wall thoroughly with 2 per cent silver nitrate once a week, and instructed her to use a saline douche the next morning and to insert a lactose capsule twice a week. Within four months the vagina was normal. Four years later she returned with a mild recurrence of the discharge, which yielded quickly to treatment with the Bu-Tab in lactose capsules.

#### *Case 2*

Mrs. A. H. M., aged 53, complained of great weakness, pressure in the lower abdomen, and general depression. Her physician had told her that she had heart disease and might die suddenly. Her blood pressure was 210 systolic, 120 diastolic, but no definite evidence of heart or kidney disease was found. The perineum and cervix were badly lacerated; the uterus was prolapsed, and there was a rather profuse, troublesome discharge. The vaginal pH was more than 7.

The vagina was thoroughly mopped with 5 per cent silver nitrate once weekly. A ring pessary was inserted to lift the uterus, and the patient was instructed to use a hot douche with potassium permanganate for forty-five minutes daily. After three months of this treatment the discharge became slightly less troublesome, but the patient did not feel much better, and the pH remained above 7.

On February 15, 1944, treatment with the Bu-lactose capsule was started. On February 23 the patient entered the office with a broad smile and said she felt as though she could lift a house. The vaginal pH was 4. When she was last seen on April 20, 1946, she said that she could do more work than her husky daughter.

#### *Case 3*

Mrs. J. C., a healthy, well nourished woman of 55, complained of a very troublesome discharge. The vaginal pH was more than 7. Bu-lactose capsules were used without any effect on the discharge or the pH, until stilbestrol by mouth was given along with Bu-lactose capsules by vagina. In a few days the vaginal pH was below 5 and the patient was feeling much better.

#### *Case 4*

Mrs. J. H. had an inflamed vagina and a troublesome discharge, with a vaginal pH of 7. Weekly treatments with silver nitrate and the use of Bu-lactose capsules gave apparently complete relief in a short time. The pH was reduced to 4½. Eight months later she returned with a moderate discharge. At that time the vaginal pH was 5. The use of silver nitrate weekly and prolonged hot permanganate douches daily cleared up the discharge in a short time. It is difficult to say whether the normal pH was responsible for the rapid cure, or whether the douche cleared up the discharge by curing an old infection of the tubes.

#### *Case 5*

Mrs. R. S., a healthy looking woman of 55, the mother of four children, began having pains in her lower abdomen and back five years ago. For the past four months the pains had confined her to bed at intervals. During the past five years she had been examined by seventeen doctors, and had been x-rayed three times. No organic trouble was found.

My examination was negative, except that the vaginal pH was above 7. The vagina looked healthy, and there was no discharge whatever. On December 15, 1945, she was put on stilbestrol, 0.5 mg. daily, and was instructed to use two Bu-lactose capsules two times a week. She was completely relieved of pain within three days without any other treatment. On April 20, 1946, she reported that she had had no more pain, but that she was nervous and slept poorly.

### *Prolonged Hot Douche*

If a patient has a chronic infection of the tubes, prolonged hot douches with normal saline or permanganate solution should be taken twice daily until the tubal involvement is cleared up(1). I first recommended that the patient use warm water in the douche bag until she had become accustomed to controlling the temperature, but I have since found it much more satisfactory to start with boiling water in the bag. The patient is instructed to close the clamp until the water escapes in a slow trickle, then to wait ten minutes and test the temperature on the back of the wrist.

The most striking result I have had with the prolonged hot douche was with a patient injured in delivery. A strong, muscular woman came in three months after the birth of her baby complaining of pain and great heaviness in the lower abdomen. She could not handle the baby or do any housework. The vaginal wall was so bruised, swollen, lacerated, and sensitive that it was not possible to pass a speculum into the vagina. There were no signs of infection. Prolonged hot douches with normal salt solution were used for one hour twice daily. Within a week

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1. Anderson, C. A.: Hot Douche, North Carolina M. J. 3: 644-645 (Dec.) 1942.

the boggy congestion was cleared up, and the patient reported more than 50 per cent relief of pain. She is now ready for a repair operation.

### *Conclusions*

The local use of capsules containing lactose and Lactobacillus bulgaricus, in conjunction with the oral administration of stilbestrol, has proven quite effective in diseases of the vagina where a high *p*H is found.

In patients with chronic infection of the tubes or lacerations of the birth canal, the prolonged hot douche has given excellent results.

## Maternal Welfare Section*

### THE MANAGEMENT OF THE TOXEMIAS OF PREGNANCY

One third of the maternal deaths in our state are due to toxemia of pregnancy. That these lives could all be saved is obvious from comparison with statistics in areas where intensive prophylactic maternal care has been instituted. Our record would be equally gratifying if we would prevent or interrupt pregnancy in women with hypertensive renal disease, would give prophylactic advice in regard to diet, weight gain and general hygiene, and would render adequate treatment when the earliest threat of preeclampsia appears.

In order to manage any case of toxemia properly, one must have a full understanding of the underlying process. Until an accurate diagnosis of the basic etiology has been made, the proper treatment cannot be instituted. In the last issue of the JOURNAL, the various forms of toxemia were outlined and the diagnostic criteria of each were given. These criteria are briefly summarized in table 1, which also gives a note on the management of each type of hypertensive disease.

No problem in medicine requires greater diagnostic acuity than this one, and no one physician should rely entirely on his own judgment. The moral and ethical code of our profession demands *consultation* for important decisions, especially when two lives are affected, as in most instances of toxemia of pregnancy.

In the management of hypertensive complications of pregnancy, several cardinal principles should be remembered:

1. **TREATMENT MUST BE INSTITUTED AT THE FIRST SIGN OF TOXEMIA—The response to treatment is directly related to the severity of the disease when the treatment is begun.**
2. **EARLY CONSULTATION IS ESSENTIAL.**
3. **INADEQUATE TREATMENT IS LITTLE BETTER THAN NONE.**
4. **THE IMMEDIATE AND REMOTE PROGNOSIS IS DETERMINED BY THE UNDERLYING DISEASE.**
5. **HASTE MAKES WASTE, AND EXCESSES IN TREATMENT COST LIVES.**
6. **TERMINATION OF PREGNANCY MAY END THE PROBLEM, BUT A FAVORABLE RESULT FOLLOWS ONLY IF THE CORRECT TIME AND METHOD OF TERMINATION ARE SELECTED.**
7. **HOSPITALIZATION IS ESSENTIAL FOR SEVERE CASES.**

These general principles will now be discussed in more detail for each of the various types of toxemias.

GROUP A.—*Diseases Not Peculiar to Pregnancy*

1. *Hypertensive Disease (Hypertensive Cardiovascular Disease)*
   - (a) *Benign (essential hypertension), mild, severe*
   - (b) *Malignant*

The internist defines essential hypertension as a disease for which no known cause can be found. It is not associated with demonstrable changes in renal function until the condition becomes malignant. Although primarily a disease of young people, it is not often a complication of pregnancy, and the diagnosis is justified only when exhaustive studies of the patient reveal no evidence of renal disease.

Obstetric opinion upon the management of this condition is somewhat divided. It is generally agreed that pregnancy aggravates the process, and that the benign form may become malignant during pregnancy. Women with the disease should be discouraged from having children. Those determined to have a family should be permitted to become pregnant only if the condition is mild, and must be watched each week for signs of renal and cardiac failure.

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*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

| | |
|---|---|
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| J. S. Hunt, M.D. | Frank R. Lock, M.D., Chairman |
| T. L. Lee, M.D. | |

Table 1

| Etiology | History | Course | Physical Findings | Urinary Findings | Management |
|---|---|---|---|---|---|
| 1. Hypertensive Disease | | | | | |
| a. Mild | Blood pressure elevated before and at the beginning of pregnancy | Usually slowly increasing hypertension | No demonstrable abnormalities except hypertension | Normal | Careful study and close supervision. **Consultation** |
| b. Severe | | Rapid increase by twenty-fourth week | Eyeground changes; perhaps edema | Albumin, red blood cells, and casts | **Consultation,** terminate pregnancy |
| 2. Renal Disease | | | | | |
| a. Mild | Nephritis or recurrent pyelitis, often in childhood | Rising blood pressure may occur before or after twenty-fourth week | Blood pressure often normal or only slightly elevated | Fixed specific gravity, trace of albumin | Careful study and close supervision |
| b. Severe | Blood pressure elevated before and at the beginning of pregnancy | Progressive hypertension, fulminating course as pregnancy advances | Usually marked hypertension, eyeground changes, edema | Numerous red blood cells, casts, usually much albumin | **Consultation,** terminate pregnancy |
| 3. Preeclampsia | | | | | |
| a. Mild | Blood pressure normal before pregnancy and during first two trimesters | Usually rapid gain in weight, edema, acute hypertension after twenty-eighth week | Edema usual. Blood pressure not exceeding 160/100 | Usually albumin only, not over ++ (0.6 Gm./100 cc) | Conservatism, rest, salt-free diet, sedation, daily observation |
| b. Severe | | | Edema usual. Blood pressure over 160/100 | Marked albuminuria, +++to++++, (0.6 Gm./100 cc.), often casts and red blood cells | Hospitalization, conservatism as above, **consultation**; terminate pregnancy when improved |

Interruption of pregnancy is justified if there is evidence of renal damage. The presence of casts, red blood cells in the urine, a fixed specific gravity, and albuminuria is definite evidence of renal impairment.

2. *Renal Disease*

(a) *Chronic vascular nephritis*

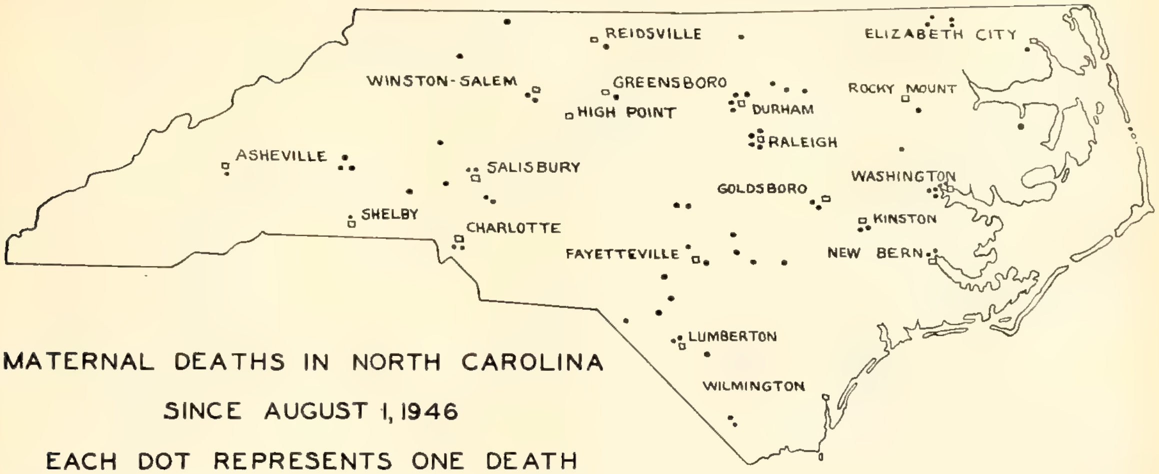
Chronic vascular nephritis (arteriosclerosis, low reserve kidney, nephrosclerosis) represents the commonest form of hypertension affecting human beings. It is primarily a disease of middle life and old age, but often begins early enough to affect women past 30 years of age. It is not an unusual complication of pregnancy.

Childbearing should be discouraged for this group also. The progress of the condition during pregnancy may not be marked, but the further complication of preeclampsia is frequently superimposed with disastrous results. Pregnancy should be interrupted, if *definite* evidence of reduced renal function is present.

(b) *Glomerulonephritis,* (c) *nephrosis, and* (d) *other forms of severe renal disease (tuberculosis, pyelonephritis, nephrolithiasis, hydronephrosis, and so forth)*

The death toll among women who have one of the above renal lesions complicated by pregnancy is appalling. Early recognition of the condition is essential if unwarranted loss of life is to be avoided. The majority of patients who exhibit hypertension (140 systolic, 90 diastolic or above) before the twenty-fourth week of gestation (five and a half months) have a basic defect in the kidney usually demonstrable by the presence of red blood cells and casts in the urine, in addition to albumin. Usually, however, the urine does not contain a large amount of albumin until the lesion is far advanced, often hopeless.

Few patients should be permitted to enter pregnancy if nephritis is known to be present. They should fully understand the in-



MATERNAL DEATHS IN NORTH CAROLINA

SINCE AUGUST 1, 1946

EACH DOT REPRESENTS ONE DEATH

creased danger to their lives, and should be prepared to accept the radical decisions which may be necessary at any time during the course of pregnancy.

The presence in early pregnancy of nephritis with hypertension, or of the urinary findings outlined above, is always an indication for a consultation concerning the patient. The patient should be sent to a hospital for careful study, including all of the available kidney function tests. The blood chemistry tests are most important, for consistent nitrogen retention is an ominous warning. Normal blood chemical determinations do not assure a successful pregnancy, however, and *should not give a false sense of security.*

Any patient with clinical and laboratory evidence of reduced kidney function in early pregnancy represents an obstetric risk of sufficient gravity to warrant a consideration of interrupting the pregnancy. This serious decision is never justified without a *bona fide* consultation; "curbstone" discussions cannot be considered as consultations.

The unfortunate record with toxemias in North Carolina is primarily the result of an inadequate appreciation of the danger of pregnancy in patients with renal lesions, and of the urgent need for treatment in these cases. Our survey thus far has disclosed that only an occasional patient has refused suggested treatment and thereby lost her life; in the majority of the fatal cases the presence of a renal lesion has not been recognized.

Evidence of impending renal failure may become apparent at any time during gestation, and always requires prompt treatment, with sufficient sedation to keep the patient quiet in bed, a high-protein, salt-free diet, and interruption of pregnancy as soon as the patient's condition permits. Hospitalization is essential for the care of these patients and must somehow be made available.

Advanced renal lesions in the late weeks of pregnancy may so closely resemble severe preeclampsia that they can be distinguished only by the progress of the patient's illness. The amount of urine excreted in each twelve-hour period and the fluid intake should be carefully measured and recorded. The comparative record gives a clear index of oliguria when this serious sign appears.

### GROUP B—*Disease Dependent on or Peculiar to Pregnancy*

#### 1. *Preeclampsia*

Preeclampsia is preventable by rigid supervision of the prenatal patient. During the last month, prenatal examinations should be done weekly and should invariably include determinations of the weight and blood pressure, and a urinalysis. The onset of hypertension in preeclampsia is acute, and occurs, as a rule, in the third trimester. It is commonly preceded by a rapid gain in weight and mild albuminuria. A blood pressure of 140 systolic, 90 diastolic, clinical edema, or albuminuria calls for active treatment. Early treatment combining rest and mild sedation, a high-protein, salt-free diet, and magnesium sulfate (Epsom salts) by mouth as a saline laxative is almost invariably followed by rapid improvement. The patient must then be checked at least once each week during the remaining weeks of pregnancy for an exacerbation or recurrence.

*Severe* preeclampsia may be an acute complication of pregnancy, or it may follow shortly when mild preeclampsia is not recognized and treated. The onset of convulsions can be avoided by adequate treatment. Although the termination of pregnancy is the ultimate aim in the treatment of severe preeclampsia, the use of mechanical and operative measures in the acute phase is contraindicated. No attempt should be made to treat severe preeclampsia in the patient's home. The essential features of adequate treatment cannot be provided outside a hospital.

A period of complete rest, with sufficient sedation to cause light, quiet sleep, is indicated. In order to assure rest a private room is desirable. The patient should be permitted no visitors, except close members of the immediate family for limited periods of time, never exceeding thirty minutes. The dose of the sedative should be adjusted so that the patient can be aroused to take fluids and food, but sleeps when undisturbed. The barbiturates are the most popular sedative in use today. A high-protein, salt-free diet and the oral administration of 4 to 6 Gm. of ammonium chloride daily encourage diuresis and assist in reducing the patient's edema. If fluid by vein is indicated, glucose in distilled water should be given. *Saline solution is absolutely contraindicated,* because the sodium ion causes further retention of fluid in the tissues and reduces the output of urine.

A graphic chart of the patient's progress, with a record of the blood pressure and urine output, is highly desirable. The blood pressure should be recorded at least every four hours. The quantitative measurement of the amount of albumin lost in the urine is of material value in determining improvement, which may not be apparent otherwise. The fluid intake and urine volume should also be carefully measured. The above line of treatment should be continued for at least forty-eight hours after delivery.

Fully 90 per cent of patients with uncomplicated preeclampsia improve strikingly on the regimen outlined. Attempts to terminate pregnancy by the induction of labor should be withheld until the patient's condition is entirely satisfactory, or until it is clear that the condition is becoming worse in spite of adequate treatment.

The simplest method of induction should be selected, and haste is usually associated with an unfavorable result. A tendency toward the spontaneous onset of labor is often present, and a dose of castor oil may initiate labor. Rupture of the membranes under strict aseptic precautions is preferred to other mechanical measures when a favorable condition of the cervix and satisfactory presentation are present.

Cesarean section is rarely indicated in the management of severe toxemia of pregnancy. The mortality which follows the trauma of a major operation under these circumstances is alarmingly high. It should be reserved for patients in whom there is an obstetric indication for the procedure.

2. *Eclampsia*

The management of eclampsia will be discussed in this section next month.

**Important notice: Re Medical Slyd-Rul enclosed in December issue of Ciba Symposia.**

**Due to manufacturers' error in the placement of a decimal point, the conversion from 0.4 grain to gram is incorrect. It should read 0.025 gram, not 0.25. Please make this correction by replacing the present celluloid table with the corrected temporary paper table now being mailed.**

**Ciba regrets this error, and will replace the temporary slide with a new celluloid table as soon as possible.**

### The Cerevim Giraffe

An aid to the physician with a large pediatric practice is the Cerevim Giraffe, an unusual height chart now being offered to the medical profession by Lederle Laboratories in connection with their pre-cooked cereal, Cerevim. Designed to enlist the cooperation of mothers and their children in keeping the valuable records of progressive development, the chart is an amusing giraffe, 42 inches high, whose elongated neck is marked off in inches, with space for correlating age and weight with height.

Cerevim Giraffes can be obtained in quantities by physicians for distribution to private patients, and also for groups such as nursery schools and children's homes. Charts, and also samples of Cerevim, are obtained by writing to Lederle Laboratories Division, New York 20, N. Y.

### Deadline

May 1, 1947 is the deadline for entering the $34,000 prize art contest on the special subject of "Courage and Devotion Beyond the Call of Duty" (on the part of physicians in war and in peace). This contest is open to all M.D.'s in the western hemisphere. The exhibition will take place in conjunction with the A.M.A. Centennial Session at Atlantic City, June 9-13, 1947. For complete information, write or wire now to Francis H. Redewill, M.D., Secretary, American Physicians Art Association, Flood Building, San Francisco, California, or to the sponsor, Mead Johnson & Company, Evansville 21, Ind.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

Josiah C. Trent, M.D., F.A.C.S., *Editor*

Durham

## OBSTETRICS AND GYNECOLOGY IN AMERICA

### I

### THE BEGINNINGS OF OBSTETRICS IN AMERICA

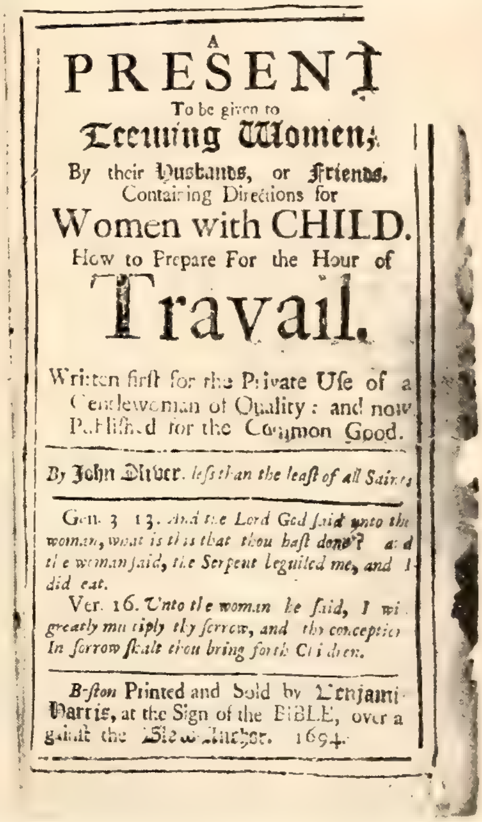
In 1694, a little book was printed in Boston, entitled *A Present to be given to Teeming Women* (fig. 1). The author was John Oliver, and his book first appeared in London, in 1663. There is little of a practical nature in the book, aside from some superficial advice to the pregnant woman on the care of her own health by avoiding excesses. The bulk of the work deals with the duties of pregnant women, which consisted of prayer, repentance, reading the Scriptures, meditation, resignation and preparation for death.

Obstetrics in colonial America was almost entirely in the hands of midwives at this period. The names of many of the colonial midwives have come down to us. The wife of Samuel Fuller, a physician, was among the passengers of the *Mayflower* in 1620, and was the earliest practitioner in Massachusetts. In New Amsterdam, "Tryn" or Catherine Jonas was the first official midwife, arriving in 1630 on the ship *Eendracht* or *Unity*. Under date of November 26, 1635, the Chamber of Amsterdam received "a letter from Tryntgen Jonas, midwife in New Netherlands, requesting an increase in wages and some necessaries."

In the journal of John Winthrop, the first governor of Massachusetts, we read under the date of June 1, 1630, that while he was aboard the ship *Arabella* a "woman in our ship fell in travail & we sent and had a midwife out of the *Jewell*."

In Europe, during the seventeenth century, great forward strides were being made in obstetrics by such men as Deventer, Mauriceau, Portal and De La Motte, but their work had little influence, especially in frontier America. In Great Britain no original work on obstetrics had appeared up to 1650.

In spite of the lack of available knowledge, some male practitioners had the hardihood to meddle in midwifery at this early period. In 1675, a Captain Raynes of Maine was presented in court "for presuming to act the part of midwife," and was fined fifty shillings. Zerobabel Endecott, the son of Governor John Endecott, practiced midwifery at Salem, Massachusetts. He was the compiler of a collection of medical receipts dated 1677. The manuscript contained imperfect and unimportant observations on obstetric operations, mainly relating to the removal of a dead fetus by instruments. The following is Endecott's receipt "For Sharpe & Dificult Trauel in Women with Child":



A
PRESENT
To be given to
Teeming Women,
By their Husbands, or Friends.
Containing Directions for
Women with CHILD.
How to Prepare For the Hour of
Travail.
Written firſt for the Private Uſe of a
Gentlewoman of Quality: and now
Publiſhed for the Common Good.

*By* John Oliver. *leſs than the leaſt of all Saints*

Gen. 3. 13. *And the Lord God ſaid unto the woman, what is this that thou haſt done? and the woman ſaid, the Serpent beguiled me, and I did eat.*
Ver. 16. *Unto the woman he ſaid, I wi greatly multiply thy ſorrow, and thy conceptio In ſorrow ſhalt thou bring forth Children.*

*Boſton* Printed and Sold by Benjamin
Harris, at the Sign of the BIBLE, over a
gainſt the Blew-Anchor. 1694.

**Fig. 1. Title-page of the Boston edition of John Oliver's A Present to be given to Teeming Women (From the editor's collection)**

> "Take a Lock of Vergins haire on any Part of ye head, of half the Age of ye Woman in trauill Cut it very smale to fine Pouder then take 12 Ants Eggs dried in an ouen after ye bread is drawne or other wise make them dry & make them to pouder with

the haire, giue this with a quarter of a pint of Red Cows milk or for want of it giue it in strong ale wort."

The only other reference to a man practicing midwifery during the seventeenth century is to be found in a letter written by Samuel Lee of New England, in 1690, to Nehemiah Grew of London. After stating that "of midwifes everyone takes whom they please," he continued: "I knew one Doctor Avery, since deceased, a man of pretty ingenuity who from the ars veterinaria fell into some notable skill in physick and midwifery & invented some useful instrumts for that case." The instruments referred to were probably devised for the removal of a dead child, since at that time the forceps were the family secret of the Chamberlens.

Obstetrics made great progress in the eighteenth century. "In the nurture and management of infants as well as in the treatment of lying-in women," wrote Lettsom in his *Medical Memoirs* in 1774, "the reformation hath equalled that in the smallpox; by these two circumstances alone incredible numbers have been rescued from the grave."

The first lying-in hospital was established in Great Britain in 1739, through the efforts of Sir Richard Manningham, whose *Compendium Artis Obstetricariae* was published in 1739-40. William Giffard's *Cases in Midwifery* appeared in 1734, with the earliest record of the use of forceps. Fielding Ould's *Treatise of Midwifery,* appearing in 1742, laid the foundation for the study of the mechanism of labor. In 1752, Smellie's great work, entitled *A Treatise on the Theory and Practice of Midwifery,* appeared.

The advancement of British midwifery affected American obstetrics in two ways. First, a number of well trained doctors immigrated from abroad at this period. Even more important, a fairly large group of young colonial students crossed the seas and came in contact with the best that was being taught at Leyden, London, and Edinburgh.

One of the first colonial physicians to acquire a reputation in obstetrics was John Moultrie, who came to this country in 1733 and began the practice of medicine in Charleston, South Carolina. He subsequently returned to Scotland for further study, graduating in medicine at the University of Edinburgh in 1749. His thesis was entitled *De Febre Maligna Biliosa Americae.* Thatcher wrote of him:

> "His death was regretted as a great public calamity. Several of the ladies of Charleston bedewed his grave with tears, and went into mourning on the occasion. The year after his decease was distinguished by the deaths of several women in childbirth. While he lived they thought themselves secure of the best assistance in the power of man or of art, in case of extremity. In losing him, they lost their hopes. Depressing fears sunk their spirits, and in an unusual number of cases produced fatal consequences. So great was the confidence reposed in his judgment, that they who were usually attended by him, preferred his advice and assistance, even on the festive evening of St. Andrews Day, to that of any other professional man in his most collected moments."

In New York, a Dr. Atwood is said to have been the first physician who had the hardihood to proclaim himself a man-midwife. The New York *Post Boy* on July 22, 1745, recorded the death from yellow fever of John Dupuy, M.D. His father had been a prominent practitioner of medicine in New York, and left a substantial library. The son had already made a reputation for himself as a midwife when he died at 27.

Blanton, in writing on eighteenth-century medicine in Virginia, noted that evidence of the changing attitude toward the medical care of pregnancy may be found all through the contemporary Virginia records. Yet, as late as 1772, an article appeared in the Virginia *Gazette* denouncing man midwifery.

William Coakley settled in Norfolk, Virginia, in 1766, and announced that his practice would include "every branch of surgery, midwifery and physic." In 1769, Andrew Anderson advertised himself as "surgeon and man-midwife" in Williamsburg. A George Gilmer, Jr., is also mentioned as a man-midwife, and a Dr. John Walker, who died in 1775, as a man-midwife in Hanover town.

The pioneer obstetrician of New England was James Lloyd of Boston, who had as his pupils such men as Oliver Prescott, Isaac Rand, Marshall Spring, and John Jeffries.

The first public lectures on obstetrics were given by Dr. William Shippen, Jr., who returned to Philadelphia in 1762, after studying with Hunter and Smellie. In 1792, Shippen held the combined chair of surgery, anatomy and obstetrics in the University of Pennsylvania. In New York City, the first professorship devoted solely to obstetrics was established in 1767 at Kings College (later Columbia), with J. V. B. Tennent as the first professor.

In Baltimore, Dr. George Buchanan and Dr. Andrew Wisenthal, who were both starting practice, attempted to found a medical school in the winter of 1789. Buchanan delivered a course of lectures on the "diseases of women and children" to a class of nine students. At the same time Wisenthal lectured at his own house on anatomy, physiology, pathology, operative surgery, and the gravid uterus. During the succeeding winter Buchanan delivered a course of lectures on midwifery and also attempted to found a lying-in hospital, but failed.

The first lying-in institution established was a private one in Philadelphia, started by Dr. Shippen in 1765 as a "convenient *lodging* for the accommodation of a few poor women who otherwise might suffer from want of the common necessaries on these occasions, to be under the care of a sober, honest matron, well acquainted with lying-in women, employed by the Doctor for that purpose."

At the Philadelphia Almshouse Drs. Bond and Evans opened a ward for midwifery cases as early as 1770, an enterprise which was revived by Drs. James and Church when the obstetric department of the Almshouse was founded in 1802. At the Pennsylvania Hospital obstetrics was the first specialty recognized officially as such by the Board of Managers, although there was no special provision for obstetric cases until 1803.

In New York, a lying-in ward was established in 1799 in the Almshouse, out of which grew Bellevue Hospital. Here Dr. Valentine Seaman gave lectures on midwifery to women exclusively. The following year these lectures were published in the first book on obstetrics by an American author, entitled *The Midwives Monitor and Mothers Mirror.*

The first successful Cesarean section in America was performed by Dr. Jesse Bennett, a country practitioner. The patient was his own wife, and during the course of the operation he removed both ovaries to prevent future pregnancy. The operation was performed on January 14, 1794, and was first described in *The History of the Great Kanawha Valley,* published in 1891. When asked why he did not report his case in some medical journal, Dr. Bennett replied that "no doctor with any feeling of delicacy would report an operation that he had done on his own wife," and added that "no strange doctors would believe that operation could be done in the Virginia backwoods and the mother live, and he'd be damned if he would give them a chance to call him a liar."

Several early operations for advanced extra-uterine pregnancy were reported in British periodicals by American surgeons. The first such report was by Dr. John Bard in 1762. Dr. Charles McKnight reported a case in 1795. Dr. William Baynham, of Virginia, reported cases in 1791 and 1799. Parry wrote: "Baynham's cases are well worth attentive study. They illustrate the intrepidity and good judgment so often displayed by the provincial surgeon, who, separated by long distances from his fellows, often has to act in the greatest emergency without the counsel which he may earnestly desire."

The first volume of transactions ever published by a medical society of the United States was *Cases and Observations; By the Medical Society of New Haven County, in the State of Connecticut,* 1788. Dr. Leverett Hubbard contributed a paper entitled *Case of a Deformed Foetus,* which he had read before the Society on April 5, 1786. This early contribution to teratology described an acephalic monster with a large sacral teratoma, and was accompanied by a fair woodcut of the specimen. Hubbard piously concluded: "What great reason have we to praise the great former of our bodies, that our children are not oftener deformed than they are."

Even before 1800 puerperal infection was prevalent throughout the country. Puerperal fever was chosen as the subject for graduation theses by Peter de Sales la Terriere, in 1789, Timothy Fletcher Wetmore, in 1795, and James Thurston Hubbard, in 1798.

As the eighteenth century drew to a close, a new group of men began to appear upon the scene who had been well trained by the important teachers of obstetrics in London and Edinburgh. In Philadelphia, Thomas Chalkley James became the first incumbent of the chair of midwifery at the University of Pennsylvania, and soon afterwards was assisted by William P. Dewees, a major figure in obstetrics. In New York, Samuel Bard and David Hosack established obstetrics upon a sound basis. In 1807 appeared the first systematic treatise, Bard's *A Compendium of the Theory and Practice of Midwifery.*

CLAUDE E. HEATON, M.D.
New York City.

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## FIRST SUPPLEMENTAL MEETING, A.M.A. HOUSE OF DELEGATES

The first regular supplemental or mid-winter meeting of the House of Delegates of the American Medical Association was held at Association headquarters in Chicago, December 9-11. The proceedings of this session have been published in the *Journal of the American Medical Association*, so only a comparatively brief report of the meeting will be attempted here.

The controversial report of the Raymond Rich Associates on the public relations of the American Medical Association was the *piece de resistance* of the meeting. It had been expected to be loaded with dynamite, but after confidential and copyrighted copies of it had been distributed to the delegates on roll-call, the consensus seemed to be that it was somewhat of a dud. It is true that some pertinent recommendations for improving the public relations of the American Medical Association were offered, but for the most part, the report was devoid of originality of thought or of expression. Most of the recommendations were the stereotyped ones that make up the stock in trade of the average public relations man. Many of the opinions expressed were obviously garnered from the sources that were utilized by the proponents of federally controlled medical practice. A good many delegates voiced objections to the final recommendation of the Rich Associates that a firm be retained as counsel on matters of general public relations—a recommendation which was prefaced by an announcement of the firm's candidacy for this position.

A special committee, with Dr. William H. Bates of Pennsylvania as chairman, had gone over the Rich survey carefully. The report of this committee, as finally adopted by the House of Delegates, is to be found in the *Journal of the American Medical Association* for December 28. A careful reading of the Bates Committee's report reveals that, while most of the recommendations of the Rich Associates are approved, the approval is guarded by cautions against surrendering too much authority to laymen. For example, in discussing the employment of a public relations expert, the following statement is made:

> "From past experience your committee knows that publicity experts, in their enthusiasm to attract attention, have been known to produce misleading headlines and tincture truth with fiction to the detriment of the dignity of the profession. With no intent to hamper this new officer, your committee nevertheless urges that all publicity and all projects promulgated by him be approved by the General Manager before published or undertaken."

More important than the Rich report was that of the committee, headed by Dr. Frank Borzell, to revise the Constitution and By-Laws of the American Medical Association. At this session the committee offered for consideration only the proposed revision of the By-Laws, leaving the Constitution to be reported on later. Each delegate was provided with a copy of the proposed revision. It soon became apparent that there were so many additional changes to be considered that it would be impossible to adopt the report as final; accordingly, a motion was made to defer action on the By-Laws until the June meeting in Atlantic City.

The general practitioner was given more recognition in this session than at any previous one since the Section on General Practice was first tentatively approved. Two brief but important resolutions were passed unanimously. Both are given in full:

> "Resolved, That hospitals should be encouraged to establish general practitioner services. Appointment to a general practice section shall be made by the hospital authorities on the merits and training of the physician. Such a general practice section shall not per se prevent approval of a hospital for the training of interns and for residencies. The criterion of whether a physician may be a member of a hospital staff should not be dependent on certification by the various specialty boards or membership in special societies."
>
> "Resolved, That the Section on General Practice of Medicine of the American Medical Association be requested to give consideration to a plan for the establishment of a certifying board to determine the qualifications for general practice and that the section be requested to make at least a preliminary report to the House of Delegates in June at Atlantic City."

A resolution was offered by Colorado condemning the political activities of Surgeon General Thomas Parran, particularly the letter he wrote to all officers of the Public Health Service(1). The reference committee which considered this resolution stated that the committee "shares the indignation expressed by the writer of this resolution," and offered a briefer, but almost equally scathing, substitute. The delegate from the Public Health Service, Dr. Crabtree, protested vigorously against the resolution, and in a lengthy speech defended the policy of General Parran. In a brief reply Dr. Lowell Goin of California completely demolished his arguments, and when the motion to adopt the resolution was put to vote, the chorus of "ayes" almost shook the building. Not even Dr. Crabtree voted against it.

Both delegates from North Carolina were appointed to reference committees. Dr. Strosnider was put on the important Credentials Committee, while Dr. Johnson, alternate for Dr. Roscoe McMillan, was made chairman of the Committee on Sections and Section Work.

Plans for the coming centennial meeting of the American Medical Association, to be held next June in Atlantic City, were announced. It is no exaggeration to say that this will be the greatest medical meeting ever held in the world.

## ANNUAL CONFERENCE OF STATE SECRETARIES AND EDITORS

The Annual Conference of State Secretaries and Editors, which has usually been held in Chicago during November, was timed this year to precede the supplementary or midwinter meeting of the House of Delegates of the American Medical Association. The conference began at 10 a.m. on Saturday, December 7, and closed next day at noon. The program had been planned by a committee from the state society secretaries, and apparently was well pleasing to everyone present. Dr. Julian Price, secretary and editor from our neighboring state, South Carolina, was elected chairman of the conference. His poise, his never-failing sense of humor, and his fairness made him an admirable presiding officer.

After the call to order and a few appropriate remarks by Dr. R. L. Sensenich, chairman of the Board of Trustees, Dr. George Lull spoke briefly on the American Medical Association, using as the basis for his remarks a semi-humorous article in the October *Scientific Monthly* on "The Qualifications of the Executive Secretary of Professional Organizations."

Dr. W. W. Bauer, Director of the Bureau of Health Education of the American Medical Association, outlined the plan for the series of broadcasts, "Doctors—Then and Now," to be presented weekly during the coming year, which marks the centennial of the American Medical Association. The series represents a radical departure from previous programs.

Dr. Creighton Barker, of Connecticut, gave an excellent address on "The State Medical Society and the State Government." Dr. James Sargent, of Wisconsin, in speaking of "The Responsibility of the Individual Physician," warned that the Veterans Administration is getting under way the largest medical care program ever undertaken in this country—one that might dwarf the proposals of the Wagner-Murray-Dingell Bill.

One of the highlights of the afternoon session was the paper by Mr. M. L. Meadors on "The County Medical Society." Mr. Meadors ably assists Dr. Julian Price in conducting the business affairs of the South Carolina Medical Association.

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1. General Parran Cracks His Whip, Editorial, North Carolina M. J. 7:113 (March) 1946.

The dinner Saturday night was the highlight of the Conference. It was followed by an address by Dr. A. L. Miller, congressman from Nebraska. This address will be discussed in a separate editorial. Following Congressman Miller's address, those present were divided into two groups, one session for editors, the other for secretaries. Two addresses were given in the editors' meeting: one by Mr. Theodore Wiprud, presenting the results of a reader-interest survey conducted by the *Medical Annals of the District of Columbia;* the other, Dr. Jonathan Forman's "Concept of the Function of a State Medical Journal." Both addresses were interesting and instructive, and evoked a good deal of discussion.

The feature of the Sunday morning meeting was an address by Hon. Dwight H. Green, governor of Illinois. Governor Green made a most favorable impression on his audience, and was interrupted again and again by applause. Especially well received were his references to the Wagner-Murray-Dingell Bill as a threat to the country, and to the national election in November as a referendum to determine whether bureaucratic control or private enterprise would survive.

Following Governor Green's address Dr. D. L. Cannon and Dr. R. N. Nye reported to the Conference an abstract of the Saturday evening sessions of the secretaries and editors, respectively. An open forum then closed the conference. A vote of thanks to the official family of the American Medical Association for their hospitality was passed heartily and unanimously.

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## THE "INTERNE" LETTER

The North Carolina Medical Journal takes pleasure in publishing in the Correspondence Section two letters commenting on the editorial, "The 'Interne' Errs," which appeared in the October issue. While this Journal does not wish to precipitate an editorial controversy, there are a few points in the letter from Dr. Lehrman, editor of *Interne,* which deserve further discussion.

The "correction" published in the December issue of *Interne* is as follows:

> "In our discussion in the September **Interne** of our article, 'Health in the South', the following appeared: '. . . the Wagner-Murray-Dingell bill, reported favorably from committee during the recently expired session of Congress . . .' This was later corrected after we had gone to press. Four members of the nine member subcommittee of the Committee on Education and Labor had approved it."

This correction leaves the distinct impression that four members of the nine-member subcommittee had approved the Wagner-Murray-Dingell Bill, whereas the statement actually referred, not to the bill, but to a health insurance survey by Senator Pepper.

Dr. Lehrman intimated that the physicians of the South are indifferent to health conditions in our territory: "One should expect that the medical profession would fully discuss and deplore these conditions," etc. It is safe to say that in no state in the Union have health conditions been more discussed and deplored than in North Carolina. For two years there has been an intensive campaign waged in the state to provide more hospitals for the smaller communities, and to expand the two-year school of the State University to a four-year school, even though the state already has two first-rate medical schools. Surely Dr. Lehrman has not been so indifferent to medical progress that he has not heard the echoes of this intensive campaign, even in far-away New York.

If, however, our health conditions are as deplorable as the article in *Interne* would have us believe, it is rather difficult to explain North Carolina's low mortality. In 1943 and 1944 the over-all death rate for North Carolina was 8.1 and 7.9, respectively; for the United States, 10.9 and 10.6. The 1945 statistics for the whole United States are not yet available, but for North Carolina the mortality was 7.6. North Carolinians, even though they may be puny, seem to live out their full life expectancy. The editor of *Interne* may be interested to know that the death rate for Negroes in North Carolina has been below the national average each year: 10 for 1943, 9.6 for 1944, and 9.4 for 1945.

Passing over the relative merits of the emblems of Hermes and Aesculapius—except to note that the description of Hermes was a direct quotation from the Oxford Companion to English Literature—let us note that the North Carolina Medical Journal is held up to scorn for its circulation of 2405, as compared with *Interne's* circulation of 20,451. The word "small," as applied to *Interne,* was intended to refer to the size of the magazine, rather than to its circulation, and was not intended by way of disparagement. Since, however, the question of circulation was raised, a brief research revealed that *Interne* is sent in large lots to the Bowman Gray School of Medicine, to be distributed among the house staff and medical students. Since no subscription is charged, it is not surprising that *Interne's* circulation is much larger than the paid subscription list of a state journal. One can only wonder, as does the officer of another medical school, "who pays for the very large number of these journals which are sent to medical colleges."

As to the charge that the policy of *Interne* is "to guide the future doctors of America into the paths of politically dominated medicine," it is only necessary to glance at the names gracing the editorial board and to read a few consecutive issues of the publication. To borrow a legal phrase, "Res ipsa loquitur."

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## CONGRESSMAN MILLER'S ADDRESS

One of the features of the secretaries' and editors' conference held in Chicago last month was the address by Congressman A. L. Miller, of Nebraska. Congressman Miller is one of the most useful members of Congress. He was a practicing surgeon until he lost both legs in an accident. After his recovery he turned to a political career, and has been as successful in this field as he was in the practice of surgery.

Dr. Miller termed the result of the November elections "not a Republican but an American victory." Of 143 candidates for the House of Representatives who were backed by the C.I.O.'s Political Action Committee, 140 were defeated. This is the most stinging defeat that the P.A.C. has yet suffered.

Dr. Miller outlined some of the tasks in store for the coming Congress. One is that of reorganizing, with forty-eight committees to be reduced to nineteen. Balancing the budget he deemed the most important job. This effort would be helped greatly, he said, by ridding the government of a million or so superfluous employees who were being paid to tell private citizens how to run their business: "Congress needs to deflate the overgrown Frankenstein bureaucratic monster." Labor legislation is necessary, he declared, in order to overcome some of the evils that have arisen from the dictatorship of certain labor leaders. "The closed shop is a monopoly—an economic hold-up." Congressman Miller estimated that there are about 2000 Communists among the government employees.

The Wagner-Murray-Dingell Bill, Dr. Miller said, is not dead, but the next one will be greatly "watered down." He emphasized the necessity for good public relations between organized medicine and the American people.

In concluding, Dr. Miller said that he expected to sponsor at least three bills in the coming Congress: one to unite all health activities, so far as possible, in one department, headed by a physician in the Cabinet; another to provide more complete home care for veterans; and a third to declare the war officially ended, and with it the war powers of the President. He asked for the support of the medical profession in helping him have these bills passed.

No higher compliment could be paid Dr. Miller than to say that he is proving as useful in Congress as our late beloved Tom Long did in the state legislature.

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## WELCOME TO DR. JOSIAH TRENT

At the last meeting of the State Medical Society, Dr. Wilburt C. Davison was elected to fill the vacancy on the editorial board of the NORTH CAROLINA MEDICAL JOURNAL created by the death of the late Dr. Frederic M. Hanes. Dr. Davison accepted the position only with the understanding that he would be allowed to resign in favor of Dr. Josiah C. Trent when the latter returned to Duke and to North Carolina.

Dr. Trent completed his fellowship in thoracic surgery at the University of Michigan and returned to Duke in the fall. Dr. Davison has accordingly submitted his resignation, and asked that Dr. Trent be put in his place.

It is needless to say that Dr. Trent has already earned his position as a member of the editorial board. The "Thumbnail Sketches" which he has been editing for the past three years have elicited favorable comment, both within and without the state. It is a great pleasure to welcome him back to North Carolina, and to the place on the editorial board which he so richly deserves.

# CASE REPORTS

## CLINICOPATHOLOGIC CONFERENCE

### Bowman Gray School of Medicine of Wake Forest College

### *Presentation of Case*

A 44-year-old white carpenter entered the North Carolina Baptist Hospital on April 20, 1943, complaining of "gradually growing weaker and hiccuping constantly for the past eight days." He had been in poor health since a severe illness in the summer of 1939. This was characterized by fever without chills, slight headache, and bouts of vomiting. He was treated at home. Six weeks following the onset, when he was apparently on the way to recovery, he suddenly developed purplish-blue pin-point and walnut-sized spots all over both feet and ankles, and a few on the arms and lips. He became severely ill again and vomited everything he ate. New spots appeared from time to time as others disappeared. He then noted bleeding from the gums around a bad tooth, and blood in the urine, feces, and expectorated material. He was sent to another hospital, where a "blood transfusion stopped the bleeding." An x-ray was interpreted as showing bronchopneumonia. He was discharged from the hospital ten days later, weighing 120 pounds in contrast to his usual weight of 165 pounds.

He returned to work in September, 1939, but stated that he never regained the good health that he had had prior to his first illness. During the next three winters he had frequent colds and stomach upsets, and marked constipation. In October, 1942, following an attack of "flu" (diagnosed by his wife), he was sick for two weeks with malaise, fever, and night sweats. He returned to work until the latter part of December, 1942, when he developed another cold, which made him so weak that he was unable to carry out his tasks. During the next four months he became progressively weaker and lost 16 pounds in weight. Polydipsia, polyuria, and postprandial vomiting developed during the three weeks before admission. Eight days before admission he began to have constant hiccups which were resistant to the usual therapy. Five days later he became disoriented and hallucinated, although there were periods during which he was well oriented.

The past history reveals that at the age of 17 he worked for one month in a granite quarry.

Physical examination on admission revealed an acutely ill, poorly nourished, middle-aged man who was mentally cloudy but was able to cooperate fairly well. He hiccuped at every breath. The axillary nodes on both sides were markedly enlarged, movable, and non-tender; the lymph nodes elsewhere were small and shotty. The pupils were unequal; the left reacted normally, the right did not react. There was lateral nystagmus in both directions. With a plus 16 lens, a membrane containing blood vessels could be seen waving around in the vitreous of the right eye; there was almost no vision in that eye. The teeth were in poor condition. There seemed to be slight left-sided facial weakness. No stiffness of the neck was noted. The lungs were clear upon percussion and auscultation, and the heart was not enlarged. The spleen was firm and quite large, extending to the umbilicus. The liver was felt 2 cm. below the costal margin. Abdominal reflexes were absent.

The specific gravity of the urine was 1.008, and 3 white blood cells per high power field, white cell casts, and granular casts were seen microscopically. Blood examination showed 11 Gm. of hemoglobin, 6,200,000 red blood cells, and 5050 white blood cells, with 76 per cent polymorphonuclears, 2 per cent eosinophils, 13 per cent lymphocytes, and 7 per cent monocytes. One differential count revealed 9.5 per cent monocytes and 5 per cent unclassified cells which were regarded as blast cells. The blood nonprotein nitrogen was 44 mg. per 100 cc., the blood sugar 112 mg. per 100 cc. Total serum proteins were 6.8—albumin 2.5, globulin 4.3; the albumin-globulin ratio was 0.6. The blood Kahn test was negative. The clotting time was 11 minutes, bleeding time 4 minutes.

A bromsulfalein test of liver function showed 20 to 30 per cent retention in five minutes, 5 to 10 per cent in fifteen minutes, and no retention in half an hour. Repeated on April 26, the test showed 100 per cent retention in five minutes, 40 per cent in fifteen minutes, and 15 per cent in thirty minutes. The Congo red test revealed 70 per cent of the dye retained in the blood.

The stool was negative for blood and parasites. Clear spinal fluid under a pressure of 30 to 60 mm. of water was obtained on puncture, and was found to contain 7 lymphocytes and 1750 red blood cells per cubic millimeter. A blood culture was sterile. Cultures of the urine showed non-hemolytic Staphylococcus albus and gram-positive and gram-negative bacilli. On one occasion 1 acid-fast bacillus was found on gastric lavage; repeated examinations on two other occasions revealed no organisms. On two occasions acid-fast organisms were found in the urine, and on May 13 several acid-fast bacilli were found in the sputum.

X-ray of the chest on April 21 showed bilateral enlargement of the hilar shadows, with marked intensification of the pulmonic markings in both upper lobes and to a lesser degree in both lower lobes. A fine granular infiltration was seen throughout the lung fields, most marked in the right upper lobe.

A left axillary node was removed for biopsy, and was diagnosed as showing a hyperplastic form of tuberculosis. No organisms were demonstrated in the sections, however.

The patient's hiccuping continued and did not respond to any of the usual methods of treatment. He was incontinent of urine and was poorly oriented at times, although there were periods in which he was mentally clear and could discuss his illness. Fecal incontinence developed on May 10, 1943, and weakness became more marked. On May 16 the patient became much worse; his blood pressure was 80 systolic, 64 diastolic, his pulse 112 and weak. Hemiplegia of the right side and some left-sided facial paralysis developed. The patient became comatose, and expired on May 17, 1943. The temperature curve was characterized by an irregular spiking course, with peaks at about 102 F. During the last four days of life, however, it gradually reached 107 F. The pulse rate increased with the temperature.

### *Discussion*

Dr. David Cayer: The four-year illness of this 44-year-old white carpenter dated back to an acute febrile disease in the summer of 1939. This was accompanied by headache and vomiting, and was characterized by spiking temperature elevations without chills, which lasted approximately six weeks. He was apparently on the way to recovery when purpura appeared. He again became severely ill, and the cutaneous manifestations of hemorrhage progressed to frank bleeding from the gums, bowel, urinary tract, and respiratory tract.

It is of interest to speculate on the patient's original illness, and also on his treatment during this time. Unfortunately, since he was treated at home the nature of the therapy is unknown, and since no accessory laboratory data are available we can do little more than speculate. It is entirely possible, in view of the prolonged course and the lack of any dramatic or progressive response during the illness, that he may have had a virus pneumonitis. We can again conjecture that he may have received sulfonamides, the toxic manifestations of which were not as well recognized and publicized then as they are today. The occurrence of purpura when he was apparently recovering from his original illness is highly suggestive that this new complication was the result of treatment and was not related to the original disease. He was taken to a hospital, and an x-ray made there was interpreted as showing bronchopneumonia. This is the first direct mention we have of any pulmonary infiltration. While he was in the hospital a single transfusion was given, and the bleeding stopped. This fact also suggests that the purpura and bleeding were most likely due to agranulocytosis and thrombocytopenia resulting from treatment, since it would be most unusual for any of the primary blood dyscrasias to respond so well to a single transfusion.

The patient lost approximately 45 pounds in weight during this period of two months, and apparently he never regained good health. He had recurring episodes of respiratory infection and stomach upsets each winter, and it is quite remarkable that he continued to work for the next three years. In October of 1942, he again became ill with a disease which bears a marked resemblance to the original illness, in that it was characterized by malaise, fever, sweats, weakness, and weight loss.

The temperature, pulse, respiratory rate and blood pressure obtained on his admission to the North Carolina Baptist Hospital on April 20, 1943, are unfortunately not stated. The patient was found to be acutely ill, mentally cloudy, and hiccuping at every breath, but able to cooperate. Hiccups occur most frequently in patients having uremia, peritonitis, or pleuritic involvement. They are often seen in patients with gastrointestinal disturbances, particularly those associated with gastritis or vomiting, and they occasionally appear secondary to lesions of the central nervous system. The description of the axillary nodes as being markedly enlarged, movable, and non-tender is quite important, since it does not fit the usual picture of tuberculous lymphadenopathy. The failure of the right pupil to react was probably due to blindness in this eye. It would be of help to know how long the vascular membrane described in the vitreous of the right eye had been present. If it dates back to the onset of the illness, it might represent the results of hemorrhage occurring along with the generalized purpura and bleeding previously described. Another significant finding was the progressive development of right-sided hemiplegia and left-sided facial paralysis. The spleen and liver were both noted to be markedly enlarged.

The accessory data are of considerable interest. In spite of the prolonged debilitating illness, the numerous exacerbations, and the original history of hemorrhage, the hemoglobin was 11 Gm. and the red blood cell count 6,200,000. This high value can not be attributed to dehydration alone, and may perhaps represent a compensatory polycythemia secondary to pulmonary changes. The small number of unclassified blast cells in the differential count may signify the terminal release of immature cells from the marrow which is occasionally seen in patients *in extremis*. The spinal fluid showed only a decrease in pressure, and 1750 red blood cells. We have no information as to whether or not a Pandy test or sugar determination was done, or whether the fluid was allowed to stand for pellicle formation. The liver function tests indicate a gradual decrease in the ability to take up bromsulfalein, and the Congo red test showed 70 per cent of the dye to be retained in the blood. Certainly in a debilitating disease of three years' duration, particularly where the liver and spleen are found to be enlarged, the possibility of *amyloid disease* must be considered. The disappearance from the blood of 60 per cent or more of the dye would have been highly suggestive of such a diagnosis.

The repeated and determined efforts which were made to demonstrate acid-fast bacilli show that the diagnosis of tuberculosis was strongly suspected. Acid-fast bacilli were demonstrated on one occasion each in the gastric lavage and sputum, and on two occasions in the urine. The x-ray report of marked bilateral pulmonary infiltration, and the pathologic diagnosis made on the axillary lymph node would also substantiate such a diagnosis.

The clinical picture of malaise, sweats, weakness and weight loss, and the findings of generalized lymph node enlargemnt, enlargement of the liver and spleen, and the evidence of diffuse pulmonary involvement provide us with a number of interesting diagnostic possibilities. The absence of any described alterations in the heart sounds, of leukocytosis, or of change in the differential count, as well as the negative blood cultures, quickly rule out the possibility of *septicemia*. There would be little reason for petechiae to be present at the onset of such an illness and absent at the time of death.

*Primary blood dyscrasias* not uncommonly are ushered in by signs and symptoms resembling those of acute infection, and the presence of splenomegaly and generalized lymph node enlargement, together with the negative blood cultures and the disturbance of the bleeding and clotting time terminally, make this a possibility. However, at no time during the patient's stay in the hospital was any leukocytosis or marked change in the differential count noted. It would be most unlikely for *leukemia* or *purpura* to have been arrested for three years by a single transfusion. In addition, patients with blood dyscrasias usually have terminal bleeding and do not expire with red cell counts of 6,200,000.

Far more likely would be the presence of one of several granulomatous disorders. The finding of lymph node enlargement, as well as the splenomegaly and hepatomegaly, the diffuse roentgenographic changes, and the involvement of one eye, might be compatible with the diagnosis of *sarcoid*. As a rule, however, sarcoidosis is a relatively benign process and few patients die of the disease. Recurring episodes of fever are uncommon in sarcoid. No mention is made in this case of the characteristic cutaneous changes in the fingers or of the hyperglobulinemia which was described by Dr. George Harrell in his work on sarcoid. The lymph node biopsy would not rule out sarcoid, since there is considerable similarity in the pathologic picture of the two diseases. However, the weight of evidence would seem to be against such a diagnosis.

Whenever there is evidence of marked enlargement of the liver and spleen, accompanied by fever and leukopenia, the diagnosis of *histoplasmosis* should be considered. Histoplasmosis is primarily a disease of the reticulo-endothelial system. Dr. D. T. Smith, in Cecil's TEXTBOOK OF MEDICINE, states that about 30 cases have been diagnosed in this country during the past eight years. It is diagnosed ante mortem by demostrating the organisms in monocytes or by blood culture. It would be difficult to make such a diagnosis in the absence of these findings, and the comparative rarity of this disease would also make it unlikely.

The vomiting, weight loss, negative blood cultures, and intracranial lesion could fit the diagnosis of *carcinoma*. Unfortunately there is nothing to suggest a primary site. The most likely site statistically would be in the gastrointestinal tract. The duration, however, would be against this site, as would the presence of bilateral lymph node enlargement, the negative biopsy, the absence of blood in the stool, and the rather marked splenic enlargement.

All the findings fit the diagnosis of *tuberculosis*. It is difficult to escape the obvious findings of fever, malaise, night sweats, and weight loss. The fact that the patient had worked in a quarry also suggests the possibility of a primary silicosis with superimposed tuberculosis. The diffuse changes described in the chest plate, as well as the negative blood culture, the repeated finding of acid-fast organisms, and the description of the lymph node removed for biopsy all substantiate this diagnosis. In view of the advanced central nervous system signs, however, we might anticipate that more manifestations of meningeal irritation would be present. Furthermore, the enlargement of the spleen in miliary tuberculosis does not usually reach the degree described in this patient.

In order to fit the entire picture into a single diagnosis, it would be necessary to assume that the illness in 1939 was of the same etiology as the terminal illness. This assumption does not seem reasonable from the facts as presented. It would be most difficult to believe that a patient having pulmonary tuberculosis as extensive as the involvement shown on the original x-ray film, which was interpreted "bronchopneumonia," could have returned to work after so severe an illness and with a weight loss of 45 pounds and could have continued to work during the next three years without some mention of chest pain, cough, and hemoptysis. It would seem much more likely that some other chronic disturbance was present at that time, and that the tuberculosis represents a terminal complication. If so, what was the other disease? It would seem to me that the most likely possibility, in view of the symptoms and findings already described, would be *Hodgkin's disease*. This condition would fit in every detail the three-year history of malaise, fever, sweats, weakness, weight loss, and enlargement of the lymph nodes, liver and spleen, and it might allow the patient to continue working over this period of time. The frequent combination of Hodgkin's disease and tuberculosis is well known. Although I would prefer to explain all the findings on the basis of a single etiology, I do not believe that the facts as given justify this explanation.

There is one other laboratory finding that I believe worthy of mention, and that is the report on the spinal fluid. The fluid is described as clear, although it was said to contain 1750 red blood cells and 7 lymphocytes. If these cells were present as a result of bleeding, we might expect that the ratio of white cells to red cells would approach that in the peripheral blood; but such is not the case. This fact makes one wonder whether or not these were actually red cells. I would be most reluctant to add a third diagnosis, but I feel that I should mention the possibility of Torula. This fungus in the spinal fluid is frequently confused with red blood cells, and the clinical course of torulosis may be confused with tuberculous meningitis.

### *Dr. Cayer's Diagnosis*

1. Hodgkin's disease, with terminal generalized tuberculosis.

### *General Discussion*

DR. R. B. LAWSON (Pediatrician): Would a skin test be of value in the presumptive diagnosis of histoplasmosis in such cases?

DR. GEORGE T. HARRELL (Internist): The clinical picture in this case was very similar to that reported to occur in histoplasmosis.

It is quite likely that many cases of this infection are being overlooked. Histoplasmosis was seriously considered by the house staff, and a search was made for organisms in the peripheral blood. With many types of infection, the presumptive diagnosis can be given support by the finding of a positive skin test to an antigen derived from the suspected etiologic agent. Large-scale surveys using antigenic material derived from various fungi have not been done in North Carolina. In the course of a recent investigation at one of the large state institutions, we had occasion to use coccidioidin as a control material. Coccidioidomycosis is not thought to be endemic in North Carolina, yet we obtained an appreciable number of positive skin reactions.

Several recent studies have appeared comparing the frequency of reaction to histoplasmin with calcifications found in the lungs during routine chest x-ray surveys. In the past we have attributed pulmonary calcifications to tuberculosis, but it now appears that we must also consider histoplasmosis more carefully.

Torula, another infection with a yeast-like organism, was suggested on the basis of findings in the spinal fluid. We do not know enough about the natural history of these fungus diseases, particularly histoplasmosis, to make a definite diagnosis on clinical grounds alone; too few cases have been reported in the literature so far. The specificity of skin test antigens derived from fungi and the dependability of skin tests in general for diagnosis need further study.

The terminal development of weakness, hypotension, nausea, and vomiting brings up the interesting speculation that the patient may have had bilateral destruction of the adrenal cortex by the etiologic agent. This destruction occurs with tuberculosis and is very common in cases of histoplasmosis studied at autopsy.

### *Anatomic Discussion*

Dr. W. C. Thomas: The postmortem examination revealed numerous various-sized areas of caseous necrosis involving the adrenal glands, the lungs, kidneys, spleen, and peribronchial lymph nodes. Microscopic examination of these tissues revealed the characteristic textbook picture of a chronic granulomatous reaction. Within the reticulo-endothelial cells of the adrenal tissue there were large numbers of intracytoplasmic encapsulated structures resembling Histoplasma capsulata. These organisms were present also in the spleen, liver, and lymph nodes. Acid-fast staining on tissues from various organs revealed acid-fast, rod-shaped organisms in an occasional lesion in the lungs.

The striking features of this case were the massive destruction of the adrenal glands, the coexistence of tuberculosis, and the generalized dissemination of the disease. Photomicrographs of the organisms and a more detailed report of the case may be found elsewhere(1).

This case was found three and a half years ago, and there is no doubt but that more of the cases should be picked up by the clinicians and pathologists in this section of the country. If our tuberculous population were carefully studied for the presence of histoplasmosis, more of these cases would be uncovered(2). Among the cases diagnosed by the surgical pathologists as "tuberculosis," without the demonstration of tubercle bacilli, will be found many cases of histoplasmosis. It is my firm conviction that all chronic granulomatous lesions should be studied more thoroughly by bacteriologic methods.

I do not feel that I am competent to comment on the specificity of the skin test for histoplasmosis, but in consideration of our general understanding of the biochemical and physiologic mechanics of the skin, together with the increasing number of reports of cross reactions between various antigens, histoplasmosis included(3), I prefer to remain a "doubting Thomas." We need to maintain a healthy attitude of continual critical evaluation of many of our "specific" immunologic diagnostic tests.

### *Anatomic Diagnoses*

1. *Histoplasmosis, generalized*
2. Pulmonary tuberculosis, miliary in type

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1. Thomas, W. C. and Morehead, Robert P.: Histoplasmosis: Report of a Case in North Carolina, North Carolina M. J. 4:378-382 (Sept.) 1943.
2. Parsons, Robert J. and Zarafonetis, C. J. D.: Histoplasmosis in Man, Arch. Int. Med. 75:1-23 (Jan.) 1945.
3. Iams, Alexander M., Keith, Haddow M. and Weed, Lyle A.: Histoplasmosis in Infancy, Proc. Staff Meet., Mayo Clinic 21:490-495 (Dec.) 1946.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

EVIDENCE: *A regular practicing physician is usually regarded as qualified to give expert opinion concerning the mental condition of a patient under his care.*

Despite the fact that regular practicing physicians are often called as witnesses in cases where the mental condition of a patient under their care is in question, they are hesitant about expressing an opinion. In most cases, however, their close relationship with the patient renders them peculiarly fitted to form valuable opinions, and the courts so hold. In such cases the practitioner is not required to base his opinion upon previously detailed evidence. In this connection, it should be stated that even lay evidence of an expert type is receivable in sanity hearings, but such testimony must be based upon facts detailed to the jury before the opinion is stated.

An illustrative case is one which was instituted for the purpose of having a guardian appointed for an elderly, allegedly incompetent man. There was medical evidence tending to show that the man was suffering from a combination of factors, mainly senile psychosis and cerebral arteriosclerosis. A general practitioner gave as evidence the opinion that the alleged incompetent was of unsound mind and memory, and was definitely unable to manage his affairs in a rational manner. He stated that he had, in fact, so informed the appellant during his treatment of him. The testimony as a whole satisfied the jury that a guardian was indicated, although considerable evidence was introduced on both sides. Upon the basis of the verdict the judge, as he was required to do, appointed a guardian.

From this decision the appellant, upon numerous objections, appealed the case to the Supreme Court. The objection of interest to physicians was the one with reference to the opinion expressed by the private practicing physician. It was urged in this connection that a proper groundwork had not been laid and that as a consequence the physician, not being an expert, should not have been permitted to express an opinion.

When this case came before the Supreme Court, this tribunal was of the opinion that a general practicing physician was within his rights in stating an opinion without first detailing to the jury the facts upon which the opinion was based. From this ruling it is evident that a general physician should have no hesitancy in expressing a primary opinion concerning a question of mental illness, keeping in mind always the fact that opinion evidence, medical or otherwise, is allowed solely for the purpose of aiding the jury and, although uncontradicted, has no binding force. Such evidence may be accepted or rejected by the jury, but its rejection does not necessarily mean that the expert's motives are impugned nor that his sincerity is doubted. (Supreme Court of Iowa, July, 1946. V. 23 N.W., p. 760)

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# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

**Vol. XX** **January, 1947** **No. 1**

PULMONARY tuberculosis is a disease of uncertainty, with periods of quiescence and of reactivation. While many individuals recover spontaneously, in others the disease may progress notwithstanding all manner of treatment. For many, recovery depends upon the knowledge and the facilities for properly adjusting the mode of life to the disease. This adjustment is best carried out under the watchful eye of the physician.

## THE IMPORTANCE OF POSTSANATORIUM CARE OF THE TUBERCULOUS

One of the great dangers to the individual with tuberculosis is that the disease may advance considerably without the patient's being aware of it. For this reason it is essential that the pulmonary condition be observed periodically by means of properly taken X-rays films.

The education of the patient is one of the principal aims of sanatorium care. The knowledge of the disease, the reasons for making adjustments in living, working and in environment, the patient's part in recovery and its maintenance, all furnish the background for his care after leaving the sanatorium. Even after discharge, his disease is still a serious potential danger to himself and to his associates.

Early in sanatorium treatment, if it is possible, it must be determined to what extent the patient will be able to return to his former work and life. If he cannot assume the so-called "normal life," efforts should be made to fit him for work suitable to his condition. Recreational therapy, occupational therapy, rehabilitation and the establishment of work tolerance should go hand in hand with the general treatment. Ideally the sanatorium should conduct its physically able patients through all the stages of rehabilitation until a work tolerance of eight hours has been reached. Others should be brought to their maximum work tolerance and be put on part-time work.

The two most satisfactory guides for determining the patient's condition are the X-ray film and the patient's temperature. Of these, serial X-ray films tell us more completely the dynamic state of the disease. When the X-ray films show marked changes for better or worse, the disease is active, retrogressively or progressively, and rest in bed is indicated. Such is the case, too, when elevation of temperature not due to other causes is present or there is loss of weight, loss of appetite, or fatigue. To determine the status of the disease, the patient should take his temperature and pulse at about 4:00 p.m. and 8:00 p.m., and keep a record of it as well as of any toxic symptoms. At least once in six weeks he should have an X-ray examination of his chest. In old chronic disease the interval may be lengthened. With such a record the physician is in a position to judge the reaction of the patient to his disease and to modify treatment as needed.

Each patient is an individual and requires individual treatment. As a general rule, after the X-ray films have revealed a practically stationary lesion for several months, and there are no toxic symptoms, the patient may become partly ambulatory. Attention should be paid to the state of his nutrition, and he should avoid overheated stuffy rooms at all times.

Life in a sanatorium is much less exacting than life at home. To have attained an arrest of the disease in the sanatorium does not mean that the arrest will continue under adverse environmental and nutritional conditions outside.

Essentially, tuberculosis is a chronic disease; in such a disease education in how to live with it and remain well is of extreme importance. Continuous readjustments should be made by a physician who knows the picture as a whole. To be successful, the treatment of tuberculosis must go on long after discharge from the sanatorium.

What the sanatorium does or can do for a patient is briefly outlined because postsanatorium care and complete rehabilitation are but an extension of the sanatorium activities. Vigilance should be the keynote of this extended period, vigilance on the part of the patient and on the part of his physician.

One can give no fixed procedure for subsequent observations of the discharged sanatorium patient. For those whose disease is arrested an X-ray examination every six months for two years probably would be sufficient, providing the patient feels well and has no symptoms. Those discharged as apparently arrested probably should have X-ray examinations every three months for one year and after that at longer intervals if all goes well. At the time the X-ray examination is made there should be a consultation with the tuberculosis physician during which advisable adjustments in the routine of the patient may be recommended.

For many years the Trudeau Sanatorium has made an effort to find out what happens to its discharged patients. Once each year, in the anniversary month of his discharge, the patient is sent a blank to fill in. In addition to a request for notice of change of address the patient is asked about his health in detail, his work and his earning capacity. This inquiry reminds the patient of the importance of a check-up of his condition. Replies are received from about 90% of former patients.

In this institution the sanatorium staff is always glad to advise the patient when requested and they welcome opportunities to cooperate with outside physicians. The staff gladly examines the patient's chest films at the request of his physician and he is told that he may return to the sanatorium at any time for a check-up. Such a check-up affords an opportunity for the attending physician to utilize the specialized services of the sanatorium staff which is more important if he is not specially trained in tuberculosis. It is the essence of teamwork that the physician attending the patient be kept fully informed about the findings and recommendations of the sanatorium staff.

The treatment of tuberculosis should be carried on over many years, even if there has been an apparent restoration of health. A knowledge of tuberculosis and its many and varied behaviors is needed by him who would carry out such treatment with skill. It must be recognized that in all cases the X-ray gives the most accurate estimate of what is going on in the lungs. The sanatorium lays the preliminary groundwork in education and provides satisfactory environmental and nutritional standards, but the treatment must go on long after the patient has been discharged. Prevention of relapse is of greater importance than treatment after relapse has occurred.

**The Importance of Postsanatorium Care of the Tuberculous, Fred H. Heise, M.D., American Review of Tuberculosis, October-November, 1946.**

# CORRESPONDENCE

December 23, 1946

To the editor:

The October 1946 number of your journal contained an editorial entitled, "The 'Interne' Errs." In our September issue *The Interne* published a parenthetical statement that the Wagner-Murray-Dingell bill had been reported favorably from a Senate Committee. This information was obtained from the New York Times. A subsequent correction by Senator Pepper, published in the New York Times, other newspapers and also in the Journal of the American Medical Association, appeared after *The Interne* had gone to press. Our correction appeared in the December issue.

However, the main point at issue is not that we printed a relatively unimportant news release. Rather, your journal appears to be far more interested in the fact that *The Interne* featured an article on "Health in the South", indicating that its people receive poorer medical care than do other Americans. One should expect that the medical profession would fully discuss and deplore these conditions even if they were only limited to an unfortunate majority—both in racial origin and economic status—but no word on this subject is to be found in your editorial other than the following weak defense:

> "We who practice in the South are becoming somewhat case-hardened to the criticisms constantly being heaped upon us by our Northern colleagues, and to the odious comparisons based

on morbidity and mortality statistics without regard to racial and economic factors."

It would also seem that your journal is far more interested in Greek mythology for, from the fact that the cover of *The Interne* displays a "two-snaked" adaptation from both Hermes' and Aesculapius' emblems, it is averred that both we and the United States Government, through its medical corps, have made a serious "mistake". For the use of this artistic symbol, we are branded as followers of "the patron of travellers and merchants, and of thieves, pickpockets and all dishonest persons". As a remedy, you feel that a change of symbol would dissociate us from the "patron of dishonesty".

But symbols and emblems do not tell the story, for *The Interne* and the Association of Internes and Medical Students, not to mention the United States Government, need not defend themselves against a silly inference of dishonesty. Perhaps the Medical Corps would also "be more zealous in its search for truth if its symbol were changed". (And would the physician who served and died now be with us had he worn the symbol of Aesculapius instead of that of Hermes?)

The sole indictment, other than mythological, that we can find after several readings of your editorial, is that our "chief mission in life is to guide the future doctors of America into the paths of politically dominated medicine". But your journal (circulation 2,405) need not have admonished a "small monthly publication" (circulation 20,541) to be more anxious to "find the truth as a medical man should be", for our search for the truth has not been blinded nor detoured by prejudice or fear of progress. We have presented many pages pro and con on group practice, voluntary health care plans and government sponsored health care legislation, in line with our policy of complete freedom of discussion on these topics. If your journal had been "more zealous in its search for truth" it could have easily discovered that neither *The Interne* nor the Association of Internes and Medical Students has taken any stand favoring the Wagner-Murray-Dingell bill or any other health care legislation. Our "chief mission in life" is to represent to the best of our abilities the residents, internes and medical students throughout the United States, to report their aspirations and to defend their educational and social positions within the hospitals and medical schools of our country.

We would appreciate it very much if you would publish this letter in your journal.

Very sincerely yours,
(signed) N. S. LEHRMAN, M.D.
Editor, The Interne

* * * *

November, 1946.

To the editor:

Your editorial, "The *Interne* Errs," warmed the cockles of my heart. So far as symbols are concerned you certainly did "hoist the enginer with his own petar." You probably had your tongue in your cheek when you suggested that a change from the wand of Hermes to the staff of Aesculapius would add zeal in the quest of truth. Evidently, what the editor of *Interne* lacks is intelligence or intellectual honesty, neither of which can be had by discarding the wand for the staff.

Sincerely yours,
(signed) J. LABRUCE WARD

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# BULLETIN BOARD

## PRESIDENT'S MESSAGE

In the November issue of the JOURNAL, under "Correspondence," was published a letter from Dr. O. Norris Smith of Greensboro. This letter was also sent to the president of the Society, and his answer follows.

My dear Dr. Coppridge:

At their regular meeting on October 24th, the members of the Greensboro Academy of Medicine devoted much time to a spirited discussion of the North Carolina Good Health Association's promotion of its aims, in cooperation with the Medical Care Commission.

By unanimous vote, the Academy resolved: "That the Academy disapproves the wording of the 'invitation' to serve on the council of the North Carolina Good Health Association extended to many physicians by the Advisory Committee of the North Carolina Medical Care Commission, because the obligation to accept the entire five-point program would give such council members no freedom of choice as to the relative merits of the several aims, and would suppress any constructive participation."

By unanimous vote, the Academy resolved: "That the establishment of another four-year medical school at Chapel Hill or anywhere else in the state is deemed a needless, useless, and extravagant expenditure of public funds. It is the least important point in the Good Health Association's program and should be considered last. The other parts of the program are of vital importance, and should be vigorously pushed to completion."

We feel that the proposed hospital construction and expansion are the most important steps in the improvement of public health and in the attraction of new doctors to medically neglected areas. When the state legislature starts to prune the tremendous budget suggested by the Medical Care Commission, the promotional publicity thus far strongly suggests that the official voice of the Good Health Association will fight for the medical school to the last gasp, and would sacrifice, if necessary, all the other aims which have merited widespread public support. The proposed medical school is a highly controversial medicine, which has been made palatable for the public by a sugar coating of our other objectives upon which there is universal agreement.

Sincerely yours,
(signed) O. Norris Smith, President
(signed) H. C. Lennon, Secretary

### Dr. Coppridge's reply:

November 1, 1946

Dear Doctor Smith:

Your letter of October 29 was delivered to me through the courtesy of Dr. Fred Patterson.

Dr. McKay, in sending out the letters to which you refer, I am sure intended to limit no doctor's freedom of choice as to what type of program he wishes to support in the interest of better medical care in North Carolina. He knew, as do all of us, that there are members of our State Society who are not in favor of the integrated program proposed by the North Carolina Medical Care Commission and by the North Carolina Good Health Association. Dr. McKay in sending out his letter tried to make it clear that he and his committee were seeking doctors, to aid in the Good Health program, who are in favor of it.

You, no doubt, know that the Good Health Association was formed about one year ago with the purpose of supporting whatever program the Medical Care Commission might adopt.

There has been at no time to date and will not be, during my administration, any effort to unduly influence any member of the State Society in forming his own opinion as to how he can best serve the profession and the state in this matter. It has been discussed in two House of Delegates meetings (in 1945 the State Society did not meet) and in every meeting of the Executive Committee since January 1944. It has always been overwhelmingly endorsed. Only last month the Executive Committee, which as you know is composed of all the Councilors and officers of the State Society, with twelve members voting, recommended the program of the Medical Care Commission—only one member dissented on just **one issue** and that—the **location** of the medical school.

It is my understanding, and that of Dr. McKay, that the Guilford County Medical Society and the Eighth District Society in 1944 voted in favor of the plan that is now proposed. As a member of the Medical Care Commission it was my pleasure to visit Greensboro in June of this year with members of the National Committee for the Medical School Survey. At a dinner, with perhaps one hundred present, the citizens of Greensboro together with many prominent members of the Guilford County Medical Society urged upon us the expansion of the University Medical School in Greensboro. Needless to say, I am surprised that the Greensboro Academy of Medicine did not, through suitable resolutions, advise that meeting "that the proposal was deemed a needless, useless, and extravagant expenditure of public funds."

Dr. Smith, the Medical Society of the State of North Carolina has pledged itself to the recommendations of the Poe Commission enacted into law by House Bill No. 594 in the last legislature. It has endorsed the recent requests of the North Carolina Medical Care Commission which constitutes the program of the North Carolina Good Health Association. Dr. McKay, as chairman of the Advisory Committee, is striving very hard to foster this work on the part of the State Medical Society. He was appointed to this assignment by Dr. Paul Whitaker, President of the Society in 1944, and has been retained in that capacity by Dr. Oren Moore and me.

You and the members of your organization may be assured that the officers of the State Medical Society will in no way attempt to interfere with your rights in supporting any type of program that you believe, in your considered opinion, is best for the state of North Carolina.

I will thank you to present this letter to your organization as well as your letter to me.

Cordially yours,
(Signed) W. M. Coppridge
President, Medical Society of
the State of North Carolina

The Guilford County Medical Society has since passed a resolution endorsing the entire program of the Medical Care Commission.

In line with the policy of the officers of the Society in attempting to keep before the membership all pertinent facts in the program of the Medical Care Commission, the following letters are published. The first, from Mr. Don Elias of Asheville to all members of the legislature, is followed by Dr. Paul Whitaker's to the same group.

December 5, 1946

Dear Senator

One of the controversial problems to be dealt with by the 1947 Legislature will be whether the tax payers of North Carolina shall at this time build a third four-year medical school and undertake the heavy financial support annually such an institution will call for. The erection of a four-year medical school and 400-bed hospital at Chapel Hill is being urged by some as an immediate necessity as a part of a better medical care program for our people.

I am one of the members of the Medical Care Commission who does not feel that it is necessary to embark on the establishment of a four-year medical school as one of our first necessities in better medical aid for those who need it in the state. I feel that our **primary** need is more regional and rural hospitals and medical centers. In order that we may create those most urgently needed at this time, the next Legislature probably should appropriate more funds than it will be possible to do. I should be very much disappointed to see a large portion of available funds appropriated for a project about which there is much difference of opinion.

I would like to call to your attention that there **is no division** of opinion on the question of doing more for the medical care and assistance of our people in the way of hospitals and medical centers. The Governor of North Carolina, every member of the North Carolina Medical Care Commission, the entire National Survey Committee, and the Medical Society of North Carolina are all unanimous in their support of a better hospital and medical care program. No one has to make any effort to convince any of these persons of the urgent necessity of more aid to health. I have a feeling that the same statement could be applied to the entire membership of the 1947 Legislature. The only division of thought is on the question of a four-year medical school.

Believing that you will want all of the information on every side of this question that you can secure, I am enclosing a page from the **Winston-Salem Journal and Sentinel** under date of October 27, 1946, which carries an article by one of the **Journal-Sentinel** writers, Chester S. Davis. I feel that the article is very fair in its treatment of this question and felt you might like to have it. For that reason, I am enclosing it herewith.

Cordially and sincerely yours,
(Signed) Don S. Elias

## Dr. Whitaker's letter:

**Subject:** Expanding the Two-Year University Medical School to a Four-Year School: Is It Justified?

Honorable ———:

May I have your attention for a few minutes to discuss with you the basic facts as I see them about one of the most important subjects that will claim your attention in the 1947 General Assembly?

I have just read a letter recently sent presumably both to you and to the entire membership of the 1947 Legislature by Mr. Don Elias of Asheville, enclosing a newspaper article by Mr. Chester Davis of the **Winston-Salem Journal and Sentinel.**

Mr. Elias states that he feels this article "is very fair" in its treatment of the role of the expanded University of North Carolina Medical School in a broad program of medical education and medical care in North Carolina. But is it? As a former member of the Medical Care Commission and Chairman of its Sub-Committee on Medical School Expansion, and as a citizen and physician of our state (with the added privilege of having served as president of the State Medical Society while this program was being formulated), I should like to respectfully submit that **the article by Mr. Davis is far from fair** in its treatment of this question.

As I see it, this Davis article is in reality a skilfully drawn article intended from its inception only to serve the negative side of the question. In the interest of fairness I wish to review highly important facts which Mr. Davis has chosen to ignore.

### I. An Unbiased Effort to Present the Facts

As an alumnus of Duke University and as a physician who has had a close association with the Bowman Gray School of Wake Forest College before and since it was expanded to a four-year school, I feel that I can speak in an unbiased manner about the University Medical School.

I have a profound admiration for our two privately-endowed schools and am deeply appreciative of what they have contributed to our state and nation. They have a definite and important part in the program envisioned for North Carolina. But at the same time it is my studied conviction that we need the expansion of our University School in order to insure the success of the program which the Commission has recommended. The problem to be solved is of such magnitude that it should receive the harmonious and cooperative efforts of all three schools.

Mr. Elias in his letter to you talks about "building" and "establishing" a third four-year medical school. I think he knows that it is not a question of establishing or building, but of "expanding" in order that the present University school can serve this state to its full usefulness and capacity.

The figures quoted in the newspaper article he sent you are an error. It would cost the state only $500,000 more a year to operate the school on a four-year basis together with a 400 bed Teaching Hospital than it will cost to continue to operate the two-year school. The expanded school, it must be remembered, would also train nurses, technicians, hospital administrators, and other types of all medical personnel as well as physicians.

### II. How the Medical School Program Developed: Read the Record

In carrying out the mandate of the 1945 General Assembly creating the North Carolina Medical Care Commission, a committee of seven out-of-state experts in the field of medical education and medical care were called in by the North Carolina Medical Care Commission to study the question of the Medical School in a program of medical education and medical care. Under the law these out-of-state experts were required only to survey **the location** of an expanded state supported school. The Commission, however, went further than the law required and requested this group of distinguished men to advise us as to **the need** for as well as location of a state supported Four-year Medical School.

These men in a noble document known as "The Report of the National Committee for Medical School Survey," by a 5 to 2 majority, submitted to the Commission a plan of medical and hospital care tailored to the needs of North Carolina. This report, along with a report of the two dissenting members, was fully, concisely and frankly debated by the Commission in full meeting assembled on August 8, 1946, and adopted by a vote of 13 to 4—more than 3 to 1. The report, the debate, and other pertinent data have been printed as "The Official Report of the Medical Care Commission on The Expansion of the Medical School of the University of North Carolina to Governor R. Gregg Cherry and the Board of Trustees."

Before making up your mind on this important and far-reaching question, may I most respectfully urge that you get a copy of this report from the North Carolina Medical Care Commission and study it carefully? In it you will indeed find both sides of the picture presented. I sincerely believe that it will be far more useful to you as a public servant than the article sent you by Mr. Elias. Dean Berryhill has also prepared an article entitled "The University Medical School" which I have suggested that he mail to you and which I believe you will find of interest in making your decision.

### III. Expanded Medical School Necessary to Supply Needed Personnel

There are a few other points that I would beg your indulgence to make.

Mr. Elias states in his letter to you that there "is no division" of opinion on the hospital and health center part of the program. Mr. Elias knows or should know that **the staffing of the new and enlarged hospital program cannot be accomplished with the present supply of personnel.** There is already an acute existing shortage of personnel to operate our present facilities. This certainly emphasizes the fact that the present training facilities in our state cannot be relied upon to supply the medical, nursing and other personnel that will be required to staff the 7,200 additional beds contemplated. The state should provide—nay, **must** provide, if the program is to succeed—training facilities that will supply the physicians, specialists, hospital administrators, nurses, dietitians, technicians, etc., that will be necessary to carry out the program of medical care which the people are rightfully insisting be made available to them. "To build hospitals without making provision for such personnel," as has been well said, "would be like building churches without preachers or schoolhouses without teachers."

The University should have the teaching facilities of its Medical School, School of Public Health and other departments so expanded and its Teaching Hospital erected at the earliest possible date. Otherwise there may be hospitals and beds needed for the sick which cannot be utilized effectively because of a lack of medical, nursing and other essential personnel, to say nothing of other vital functions that a Teaching Hospital and its staff would render the smaller communities throughout the state. **The expanded University Medical School could and should do in the field of medical and hospital care what State College has done for agriculture and industry** and it should be given the opportunity to render this vital and necessary service for the state through expanded facilities. It is the responsibility of the University Medical School as an agency of the state to do just this.

Only the function of state-supported training facilities can be relied upon **to supply the personnel to staff the state system of hospitals.** The faculty members for the University's third and fourth year of medicine should be appointed with the understanding from the beginning that they are to participate in the integration and expansion services which are properly the responsibility of the University School. In this capacity the cooperation of privately endowed schools, to the limit of their ability to render such services, should be sought and utilized to the fullest. The University School would welcome this cooperation.

**The recruitment of students qualified to become physicians and nurses** is another function which a University Dean of Students could be expected to perform. He would advise them during their student days and when they are ready for service he would guide them to the locations, chiefly rural, where they are so badly needed, provided all other phases of the program recommended by the Commission are carried out.

### IV. Expanded Medical School Needed to Enable Poorer Boys to Practice

And now I come to my final points. Medical education is the most expensive of the professions in both time and money required of students. Many qualified boys and girls are prevented from following a useful career of medicine by the simple fact that they cannot afford the cost of medical education. And here some data from the August 17, 1946, issue of the **Journal of the American Medical Association** is highly significant. **In ten four-year approved state-supported medical schools** the average tuition and fees for the four years of medicine total $1,076 for residents and $1,993 for non residents, while the tuition and fees in **ten privately supported schools** averaged a total of $2,208. **The resident student of a state-supported medical school thus enjoys a tuition advantage on an average of more than $1100** over the student who attends the privately-supported schools, to say nothing of the expense of travel to a school at a distant point. This amount of money means a great deal to a boy of limited means struggling for a medical education.

The suggested Dean of Students in an expanded University Medical School and the loan fund of the Medical Care Commission, together with the fact that tuition and fee costs are more than $1000 less in a state-supported medical school as compared to privately supported schools, could contribute greatly to solving the financial problems of many boys and girls who wish to serve their state as doctors and are now prevented from doing so.

### V. Two Year Medical Schools Must Expand or Close

While the financial items of tuition and travel are important, there is another serious problem existing in the fact that the student who is taking two years of medicine in a two-year school finds it increasingly difficult and at times impossible to find a four-year school that will admit him for his third and fourth years. **This forces the states that support two-year schools to face the necessity of expanding their medical schools to four years or closing them.** In view of the Medical and Hospital Care Program of the state (about which Mr. Elias states there "is no division") and the resultant urgent need of professional personnel, the consequences of closing the University two-year medical school would be tragic.

### VI. Let's Listen to Five Competent Groups

Can it be that Mr. Elias would want his State University to get out of medical education in the light of our dire needs of the future? Mr. Elias and his associates in opposition to the Medical School angle of the program were charged with the responsibility of solving an urgent and compelling need to improve the health conditions of our state when they accepted appointment to the present Commission. They should think a long time before they attempt to destroy and defeat a vital part of the balanced program which the Commission after laborious effort and study has presented to the legislative representatives of the people for their consideration. In their opposition they disregard five competent groups as follows:

1. **The 5 to 2 majority** of the National Committee for Medical School Survey.
2. **The 13 to 4 opinion** of the Medical Care Commission after hearing all sides of the question debated.
3. **The unanimous verdict** of the committee of Past Presidents of the State Medical Society.
4. **The specific pledge** of the Democratic state platform.
5. **The emphatic endorsement** of this program by some of the foremost medical authorities in the nation. (See minutes of August 8 meeting of North Carolina Medical Care Commission.)

How much weight should the opinion of Mr. Davis have as compared with the combined wisdom of these five groups?

This statewide program is practical and within the ability of the state to undertake and maintain. **If it is to accomplish the high and useful purpose envisioned for it, all angles of it must be carried out.** To attempt to delete or destroy certain parts of it would be tragic. I hope and respectfully urge that you examine carefully the materials referred to, with the firm belief that when you have done so this great humane and practical program will have your fine support.

Assuring you of my appreciation for your consideration of this letter and with greetings in the true spirit of Christmas, I am

Respectfully yours,
(Signed) Paul F. Whitaker
Chairman, Committee on Four-Year Medical School, N. C. Medical Care Commission,
November 1945-November 1946

The North Carolina Medical Care Commission on August 8, 1946 adopted the majority report of the National Committee for Medical School Survey. Voting 13 to 4 the Commission felt that the language of the National Committee's report was clear when it said on page 2 of the report:

"That the planning of the Medical School development proceed as may be convenient, that, however, the construction and operation of the expanded medical school appropriately be timed with the development of the program for the construction of hospitals and health centers, in order to insure a properly coordinated advancement of the total State-wide health-service project of North Carolina."

The four dissenting members of the North Carolina Medical Care Commission interpreted the above statement to mean that the medical school expansion should await a state-wide program of hospital construction. This impression is expressed in the minority report of the Commission signed by these gentlemen as follows:

> "This minority report of the Commission directs attention to the fact that the majority report of the National Committee which recommends **another*** medical school for North Carolina **does not recommend†** the **immediate†** establishment of such a school . . ."

Everyone understands that after all *expansion* of a fifty-year-old school is all that is contemplated, but since there seemed to be some difference of opinion as to the interpretation of the National Committee's report, Dr. Sanger, chairman of the Committee, was asked to clarify the opinion of his committee. The minority report goes into great detail in an attempt to show an inconsistency in Dr. Sanger's views on medical education as expressed in the National Committee's majority report and in a report he made after studying the medical educational needs in Mississippi. Dr. Sanger also touches on this subject in his letter to Mr. James Clark, chairman of the North Carolina Medical Care Commission, as follows:

December 17, 1946

Dear Mr. Clark:

Having read a copy of the minority report of the North Carolina Medical Care Commission as addressed to Honorable R. Gregg Cherry, Governor of North Carolina, I feel it a duty to make comment as a member of the National Committee for the medical school survey and as one of the signers of the majority report of this committee, dated July 1, 1946. There is every desire not to precipitate controversy, but merely to comment in justice to our report which was based upon careful study and developed after due consideration and discussion.

If our report is construed as intended and as we thought the language warrants, it may be summarized thus: That North Carolina expand its medical school at Chapel Hill into a medical center, the elements of which are set forth on page 1 of our report; that the activities of this medical center be integrated with the proposed state-wide network of hospitals and health centers, in order to give them the utmost in clinical and other consultative services and continuing educational opportunities for all grades of personnel, thus removing the barriers of current medical isolation for outlying health service units; that all of these consultative and educational arrangements be made voluntary and include the cooperation as far as offered of existing privately endowed medical schools of the State; that the development of the medical center both physically and functionally be so timed as to proceed step by step with the development of the State network of hospitals and health centers so as to keep these two large undertakings in proper balance, that neither of them may claim an undue portion of public interest or public support; that basic to the success of the health program in North Carolina viewed both from the standpoint of the medical center and the hospital network there be evolved a practicable plan for financing the various elements of medical and hospital care in the state.

It seems to me that it ought not to be difficult to understand the essentials of our majority report and the reasons for them. North Carolina had given rather exhaustive study to its health problems before our committee came to the State. Our report was prepared in the light of that study which made unnecessary recounting all of the functions which normally can be served by four-year medical schools and allied activities, such as its service in caring for indigent patients, as the detailed mechanics of its relation to the better distribution of physicians between urban and rural populations, or even its obvious advantages to North Carolina students in obtaining undergraduate medical instruction, to say nothing of the advantages to the State in continuing postgraduate and graduate education. Our purpose was different—it was to determine whether the medical school expansion was justified in terms of any new developments in the State or in the nation. Hence, major consideration was given to possible functions of a state-supported medical center in relation to the development of a state-wide system of health centers and hospitals designed to give the distribution and quality of medical care which the State needs and aspires to. On this point, our findings were positively in the affirmative. A much more detailed report could readily have been developed in support of such findings had it been thought necessary. We had reason to believe that the able leadership in North Carolina had passed the point where such details were necessary.

Frequent reference in the minority report under discussion here to my report on medical education in Mississippi is made. All that I ask is that this report be read in its entirety and its findings applied to conditions in Mississippi which are far different from those in North Carolina. Then any attempt to argue the case in North Carolina on the basis of analogy with Mississippi breaks down because such argument by definition requires that the fundamental underlying conditions have reasonable identity or similarity. There is an old saying that almost anything can be proved by the use of bits of scripture disassociated from their contexts. One smiles at a similar use of sentences fished out of the Mississippi report.

The author of the minority report does not seem to understand the implications of coordination and integration used frequently in our report as referred to above in this letter. He states in effect that this is the function of government, that the integrating factors should be financial and statistical. It is easy to press such a principle of integration into overstandardization which may be deadening. Our proposal is to achieve coordination and integration as a process of professional education and professional consultation provided everywhere and for whomever needed, conducted at the medical center or at the most remote outpost unit of the hospital-health center network. Thus, the highest type of health service can be given at any point in the State not just at the medical center. Future distribution of medical care, we believe, could only be secured by eliminating isolation and by raising the quality of service to the highest possible point regardless of where given. This sort of thing is successful in three or four areas in the United States at present and unless North Carolina bestirs herself, many other states will outdistance her in a program which on the basis of early plans should give North Carolina first place in the nation.

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* Italics ours

† Italics theirs

Finally, the burden of this minority report seems to be to argue for postponement of medical school development in favor of the immediate development of the hospital network. To attempt to prove that from our majority report is contrary to our purpose and the language of our report. I, myself, wrote section II. page 2, which deals with timing, presented it to our committee which considered it and approved it unanimously at its last meeting when six members were present. No voice was raised against it. Not knowing where the various hospitals and health centers of the State network were to be located, no blue print for this network and its related medical center could be included in our report. However, it ought to be obvious that neither of these features of the State program should be given priority and we attempted to say this, that the timing should be such that they would go along step by step together. Even when the medical center and its complex activities are under way at full tilt, the center will be put to it to supply all of the twenty or more types of professional and technical personnel required to operate the various units of the hospital network and in addition, keep them up to date and growing.

Sincerely yours,
(Signed) W. T. SANGER

It seems that this letter clearly sets forth the views of the National Committee and leaves room for no misunderstanding in their interpretation.

In the December issue of *Southern Medicine and Surgery* Dr. W. S. Rankin published an article entitled "Why I Am Opposed to a Third Four-Year Medical School." Dr. Rankin gives two reasons, one minor and the other major, for this opposition. The minor reason concerned (1) that the school is not needed. This, of course, is a matter of opinion. The National Committee said it is needed. I have letters in my possession from the following leaders in medical education in this country who say it is needed and commend the purpose for its expansion:

Dr. Kenneth M. Lynch, Dean
Medical College of South Carolina, Charleston, South Carolina
Dr. Roger I. Lee, Boston, Massachusetts
(Former President of the American Medical Association)
General James Stevens Simmons, Dean
School of Public Health, Harvard University, Boston, Massachusetts
Dr. Cyrus C. Sturgis, Professor of Medicine, University Hospital, University of Michigan, Ann Arbor, Michigan
Dr. Joseph T. Wearn, Dean
School of Medicine, Western Reserve University, Cleveland, Ohio
Dr. E. M. MacEwen, Dean
College of Medicine, State University of Iowa, Iowa City, Iowa
Dr. H. E. Jordan, Dean
School of Medicine, University of Virginia, Charlottesville, Virginia
Dr. Hugh J. Morgan, Professor of Medicine
School of Medicine, Vanderbilt University, Nashville, Tennessee
Dr. John Walker Moore, Dean
University of Louisville Medical School, Louisville, Kentucky (also President of the Association of American Medical Colleges)
Dr. G. Canby Robinson, Baltimore, Maryland
Dr. Warfield T. Longcope
Johns Hopkins Medical School, Baltimore, Maryland
Dr. William Pepper, Dean Emeritus
University of Pennsylvania School of Medicine, Philadelphia, Pa.
Dr. H. B. Mulholland, Professor of Medicine
University of Virginia, Charlottesville, Virginia
Dr. T. Grier Miller, Professor of Medicine
University of Pennsylvania, Philadelphia, Pennsylvania
Dr. Eugene Pendergrass, Professor of Radiology
University of Pennsylvania, Philadelphia, Pennsylvania
The late Dr. Frederic Hanes, formerly Professor of Medicine
Duke University, Durham, North Carolina

These letters, or copies of them, can be made available to those who would like to read them. So after all, authorities disagree; certainly no one can doubt the authority of any of the above medical educators.

The *minor* reason for Dr. Rankin's objection concerned (2) transportation of charity patients to the central hospital—that ambulances had been suggested and also that the purpose of the central hospital was to treat largely charity patients.

The only reference I can find in any of the Poe Commission reports to the above subjects is in a statement from my committee of the Poe Commission, i.e. the Committee to Study Hospital Plans in other states. It was prepared in September, 1944. The passages bearing on these subjects read as follows:

> "The resources of the hospital should be available to all citizens of the state. It should not be confined to service to indigent cases, although ample accommodations should be had for all such patients from any section of the state. A proportion of the beds, determined after study by the hospital council, should be arranged in wards for Negro patients, and the percentage should not necessarily be based on the ratio of the colored to the white population. The need of medical services may be found, upon study, to be greater among Negroes than among the white population."

In dealing with transportation the following paragraph reads:

> "Transportation of patients has not, in our investigations, proved to be troublesome to institutions located in small communities. The highway system of this state seems well adapted to the quick movement of patients from all sections. If found advisable, a system of ambulances, similar to that operated by the state of Iowa, may be used. We found many advantages in such a system and it was shown that in Iowa the plan worked to the entire satisfaction of officials there. Railroad service is not particularly adapted to rapid movement of sick persons. Looking into the future, it is quite possible that in a few years air transport will be much more widely used for this purpose, and if so, the large new airport at Chapel Hill will likely be more ac-

cessible to such a hospital than any of the municipal airports could be if the hospital were located in a larger community." (It is interesting that the first Civilian Air Ambulance service in the United States was inaugurated in Durham on September 21, 1946.)

So far as I am able to find there has never been made any serious recommendation concerning ambulance service or the limiting of the teaching hospital to entirely charity patients.

The minor objection concerns (3) the claim that expansion of the Medical School will result in more even distribution of doctors in the state. The National Committee's majority report supports this claim—which is, that the expanded medical school *together with hospital expansion* will result in more equitable distribution of doctors and medical service. The University of Tennessee has definitely proved that a state-controlled medical school can greatly affect the distribution of its graduates within the state, even in the absence of a hospital expansion program throughout the state.

Dr. Rankin goes to some length to quote the Council on Medical Education and Hospitals seeking to prove that that body condemns the expansion of the medical school. It is true that the Secretary of the Council, Dr. Victor Johnson, did disagree with the majority report of the National Committee and while he stated he was expressing his own opinion and not that of his Council, he elected to carry the matter to the Council and seek their prestige in backing up his minority opinion. It is true that the Council on July 2 in San Francisco, at the request of Dr. Johnson, did issue a statement stating that they could not recommend the expansion. This action was hurriedly taken with no facts before the Council except those that Dr. Johnson chose to give. Later in the year, on December 8 in Chicago, after the individual members of the Council had been given opportunity to study the proposals and express their own opinions, rather than those of Dr. Johnson (as they had done in July) the following letter was addressed to me by Dr. Weiskotten, the present Chairman of the Council:

December 10, 1946

Dear Doctor Coppridge:

The question of a medical school in Chapel Hill was thoroughly discussed at a meeting of the Council on Medical Education and Hospitals held in Chicago on December 8, 1946.

The Council realizes that no request has come from the University of North Carolina for its opinion in regard to the development of a four year medical school at Chapel Hill.

Although, in general, the Council on Medical Education and Hospitals does not feel justified in assuming the responsibility of recommending the development of a four year school in any small community, the Council does concur in the opinion of Dr. Ray Lyman Wilbur which is expressed in the following excerpts from a letter dated August 8, 1946 addressed by him to President Frank Porter Graham:

"There has been a general feeling among physicians that medical schools should be located in the larger cities, as this certainly makes it possible more readily to conduct public clinics for outpatients and secure a volunteer part time clinical staff. Nevertheless there is no single standard in this or in any other country that can be insisted upon.

"With sufficient funds for the medical school and sufficient hospital facilities, and with special arrangements for outpatients, obstetrical cases and emergency surgery, a small community could be the center for a successful medical school. State institutions for the mentally ill can be brought into the neighborhood of Chapel Hill and operated at State expense, but staffed by the medical school faculty. It might work out that training in such a center would bring about more attention to the health of the rural population and would stimulate those who received the M.D. degree to do their medical work in rural areas.

"The distance of the University of North Carolina from any thickly populated area will be a handicap which will require a special effort to overcome. Some plan will have to be worked out by which patients can be brought to Chapel Hill for both outpatient and inpatient attention. It seems to me that a carefully chosen group of physicians could make a success of such a medical center if, outside of hospital expenses, there is available an annual sum in the neighborhood of a half million dollars for the medical faculty, the medical library, and the expenses of the laboratories and incidental research. The faculty expense would be larger than in cities, where there is a group of physicians willing to do part time work on a nominal basis as members of the clinical staff of the medical school. Success would depend upon the freedom of a group of well prepared men to work out a local solution at Chapel Hill and do medical work of such high quality that it would attract attention throughout the State of North Carolina and eventually the nation."

The Council is aware of the efforts of the University of North Carolina, the Medical Society of the State, the government and other interested people in assessing the medical needs of the state and are vitally interested in your concept for a completely integrated plan of health service.

Yours truly,
(signed) H. G. WEISKOTTEN
Chairman

It can be seen that the final action of the Council is quite different from that taken on July 2 in San Francisco.

The major objection of Dr. Rankin is that "Another four-year medical school in North Carolina will be constructed and operated with funds that are needed by our general hospitals and by our mental hospitals."

The budget finally adopted by the Medical Care Commission was arrived at after repeated consultations with heads of the tuberculosis and mental hospitals. The final draft of the budget request was made after requests from the late Dr. Paul McCain and representatives of the mental hospitals, that requests for appropriations to these institutions be left out of the Medical Care Commission's request. That the Mental Hospital Board was well satisfied with the Commission's request and general program was evidenced by the following resolution passed by that Board on October 12, 1946,

Whereas, at the present time the institutions under the management of The Hospitals Board of Control are suffering for lack of trained personnel in their attempt to care for the mentally ill in the State and,

Whereas, at the present time there are occasions when it is necessary to confine certain persons who are mentally ill in the county jails until they can be admitted to our institutions, and

Whereas, at the present time there are practically no provisions made in any hospital in the state for the emergency care of mentally ill persons, and

Whereas, the 1945 General Assembly made provision for the appointment of a Medical Care Commission and instructed them to make a survey to ascertain the hospital needs of the state and report to the next General Assembly their findings, and

Whereas, the 1945 General Assembly instructed the Board of Trustees of the University of North Carolina to expand their two year medical school into a standard four year medical school, after certain conditions have been complied with, and

* * * *

Therefore, be it resolved by the Hospitals Board of Control:

1. That we enthusiastically endorse this six point Health Program that has been proposed.
2. That we request the Medical Care Commission in their hospital program to see to it that each hospital or health center receiving aid from the state have at least one room properly equipped for the mentally ill to be for the temporary care of emergency cases.
3. That we request the Board of Trustees of The University of North Carolina to include in their plans for the extension of the two year medical school to a standard four year school a Division of Psychiatry fully manned and equipped to turn out trained psychiatrists, efficient nurses and technicians for institutions caring for the mentally ill.
4. That we request the Dean of the above mentioned Four Year Medical School and the General Superintendent of our Mental Institutions to work out plans for complete cooperation between the Psychiatric Division of the Medical School and Hospital and the Mental Institutions to the end that each may be helpful to the other.

This resolution was offered by Senator Clark, seconded by Mr. Richardson and was passed unanimously.

The following is a tabulation of the budget request of the Commission:

PERMANENT IMPROVEMENT

| | First Biennium | | Second Biennium | |
|---|---|---|---|---|
| | 1947-48 | 1948-49 | 1949-50 | 1950-51 |
| **Hospitals** | | | | |
| Local Hospitals | $ 3,000,000 | 2,500,000 | 2,300,000 | 2,000,000 |
| Health Centers | 375,000 | 375,000 | — | — |
| Teaching Hospital | 1,375,000 | 1,375,000 | 840,000 | — |
| **State of North Carolina** | 4,750,000 | 4,250,000 | 3,140,000 | 2,000,000 |
| **United States**—Hill-Burton Act Grants | 4,062,000 | 3,562,000 | 2,425,000 | 2,000,000 |
| County and Local | 3,375,000 | 2,875,000 | 2,300,000 | 2,000,000 |
| **Our People will get** | $12,187,000 | 11,687,000 | 7,865,000 | 6,000,000 |

Dr. Rankin was present at the hearing before the budget commission and offered no comment upon it.

Analysis of these figures shows that of the $17,500,000 expected from the Hill-Burton funds only $12,049,000 is requested for the medical care program, leaving $5,500,000 of the Hill-Burton funds to be used by the state on a 1/3 - 2/3 basis which creates a sum of $16,500,000 to be used if necessary for mental and tuberculosis hospital expansion. Of the $14,140,000 requested of the state over a four year period, only $3,590,000 is for the teaching hospital, leaving $10,550,000 as the state's part for the construction of hospitals and health centers—this is on a 1/3 basis with federal funds and local community funds. This would create, if it were all used, a fund of $31,650,000 for hospital construction throughout the state over a four-year period—which after all is quite a sum for that period.

It is regrettable that controversy is inescapable in the developmnt of a program such as that proposed by the Commission. It has been projected by a group of earnest and sincere persons many of whom are members of our Society. There are also members of the Society who join the minority in opposition. The chief contention of the opposition is that the medical school should not be expanded.

It has been argued that the use of a medical school to assist integration of a hospital program is something new—has never been tried. As a matter of fact it is being tried in Virginia by the Medical College of Virginia and is claimed to be a success. But whether or not it is new—there is certainly need for some type of integrated service to small hospitals. There is also need for changes in the medical curriculum that will make the graduates more conscious of the social aspects of medical practice. The ideas of Dr. Henry E. Sigerist, Director of the Institute of the History of Medicine, at Johns Hopkins University, as expressed in his book, THE UNIVERSITY AT THE CROSSROADS(1), are very definite on this point. This paragraph seems to sum up to some extent his views:

> "Once we recognize that conditions of medicine and society have changed and that a new type of physician is needed we must admit that the objective of medical education has changed also. A new medical school with a new curriculum to make a new step forward in the training of physicians is needed today as it was 50 years ago when the Johns Hopkins School of Medicine was organized."

We can hardly be fair and say that medical education is stationary and cannot be improved upon. The mere fact that the idea is new certainly does not condemn it. In 1893 Osler, Halsted, Kelly, Welch, Mall, Howell, and Abel assembled at Hopkins—all young men, under 40—and began a new system of medical education that has been an example for the world to follow for fifty years.

It is well recognized by all of us that the present medical school at the University must soon be abandoned if it is not expanded. Therefore, the real issue comes to light, which is—shall the State of North Carolina refuse to furnish any semblance of medical education for its citizens and impose the whole burden on private philanthropy? That the two-year school is doomed is borne out in the following letter from Dr. Weiskotten—written in answer to questions that I submitted to him. Certainly no one in this country should be in a better position to answer them.

December 10, 1946

Dear Doctor Coppridge:

As Chairman of the Council on Medical Education and Hospitals of the American Medical Association I am sending to you a communication expressing the attitude of the Council toward the development of a four year medical school by the University of North Carolina.

In your letter of December 3, addressed to me as Dean of Syracuse University College of Medicine, you request my opinion in regard to certain specific problems. I, as an individual, am very happy to give you my opinions in regard to them. The problems as expressed in your letter are as follows:

"1). Is the Council recommending the establishment of any new two year medical schools?"

The Council is not recommending the establishment of any new two year medical schools. Furthermore, it is my opinion that the Council does not contemplate recommending the establishment of any new two year medical schools.

"2). In view of (1) the difficulties of securing first-rate teaching staff in the two year schools, (2) the increasing importance of correlating the preclinical and clinical training in the first two years of the medical curriculum, and (3) the probable increase in the difficulty in transferring students, do you believe that the existing two year schools can continue to function indefinitely?"

It is my opinion that except under unusual conditions it will become increasingly difficult for the existing two year schools to continue to function as such.

"3). In its long range planning should the State of North Carolina continue its efforts to improve the existing two-year State University school as a permanent institution on its present status or look to its gradual suspension of activity?"

It is my opinion that unless the University of North Carolina can develop some program either in cooperation with some one or more other approved medical schools or under its own administration to provide for its students a satisfactory well coordinated program of undergraduate medical education, it should seriously consider the justification of the continuance of its present two year school...

Please be assured that I personally and as chairman and a member of the Council on Medical Education and Hospitals of the American Medical Association will always be happy to discuss frankly with you and your state society any problems which may arise in the field of medical education and hospitals and will be anxious to be of any assistance possible to you.

Sincerely,
(Signed) H. G. WEISKOTTEN

The issue is clear. The state has had presented a program for extension of medical services to the areas most in need of them. It entails hospital and medical service expansion as well as the training of personnel to carry on the work. It is a long range program that will require years for perfection. It puts the state with all its resources behind a great effort to better spread good medical care. It calls for close cooperation with all the endowed agencies and institutions to the end that all will benefit. The people of the state must decide what course they wish to follow. It is my hope and firm belief that the medical profession of the state will cooperate fully with whatever plan is adopted so long as it promises to give better medical services to the people.

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1. Sigerist, Henry E.: The University at the Crossroads, New York, Henry Schuman, 1946, p. 115.

# MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

## MINUTES OF MEETING OF COMMITTEES

**December 1, 1946**

Certain committees of the Medical Society of the State of North Carolina met in called session at the Hotel Sir Walter in Raleigh, at 11 a.m. on December 1, 1946. The president of the Society, Dr. William M. Coppridge, called the meeting to order and presided. The following doctors were present:

**Officers:**

Dr. William M. Coppridge, Durham, President
Dr. Frank A. Sharpe, Greensboro, President-Elect
Dr. James B. Bullitt, Chapel Hill, Second Vice President
Dr. Roscoe D. McMillan, Red Springs, Secretary-Treasurer

**Councilors:**

Dr. John Cotton Tayloe, Washington, Second District
Dr. Newsom P. Battle, Rocky Mount, Fourth District
Dr. M. D. Hill, Raleigh, Sixth District
Dr. J. H. McNeill, North Wilkesboro, Eighth District
Dr. I. E. Shafer, Salisbury, Ninth District
Dr. D. M. McIntosh, Sr., Old Fort, Tenth District

**Committee chairmen and others:**

Dr. Charles W. Armstrong, Salisbury
Dr. R. T. Bellows, Charlotte
Dr. M. D. Bonner, Jamestown
Dr. J. Street Brewer, Roseboro
Dr. H. L. Brockmann, High Point
Dr. E. I. Bugg, Durham
Dr. George L. Carrington, Burlington
Dr. W. C. Davison, Durham
Dr. J. S. Gaul, Charlotte
Dr. H. B. Haywood, Raleigh
Dr. E. McG. Hedgpeth, Chapel Hill
Dr. R. D. Kornegay, Rocky Mount
Dr. Hamilton W. McKay, Charlotte
Dr. Zack D. Owens, Elizabeth City
Dr. K. B. Pace, Greenville
Dr. Paul G. Parker, Erwin
Dr. D. I. Rose, Goldsboro
Dr. F. C. Smith, Charlotte
Dr. Hugh A. Thompson, Raleigh

President Coppridge stated that the purpose of the meeting was to decide upon a legislative program before the next session of the legislature convened.

Dr. M. D. Hill, chairman of the Committee on Revision of the Nurses Practice Act, reported that the State Nurses Association had agreed not to ask for any alteration in the Nurse Examining Board or in the Standardization Board, and that they had asked the Medical Society to help them get a reduction in the reciprocity fee from $25 to $15, an increase in the examination fee from $10 to $15, and annual re-registration of all nurses. After considerable discussion the report of Dr. Hill was referred to the Executive Committee for consideration and action.

Dr. R. B. McKnight, chairman of the Committee to Study the Basic Science Law, recommended that the matter of a basic science act not be taken up in the next legislature, but deferred until the Medical Practice Act can be studied and revised. After discussion, Dr. McKnight's recommendation was voted upon and carried.

Dr. Hamilton W. McKay, chairman of the Advisory Committee to the North Carolina Medical Care Commission, asked permission to issue to every doctor in North Carolina a statement recapitulating the basic principles of the medical care program. This permission was granted.

Dr. G. Westbrook Murphy, chairman of the Committee to Evolve a Satisfactory Plan for the Administration of the Medical Provisions of the Workmen's Compensation Act, was not present. Secretary McMillan read the report of the Special Committee on the Industrial Commission, together with several pertinent communications. After considerable discussion, Dr. Shafer moved that the communications from Dr. Murphy be tabled until the committee submits a report upon which action can be taken. Dr. Owens seconded the motion, and it was carried.

In the absence of Dr. Erick Bell, chairman of the Committee on Ways and Means of Establishing an Executive Secretary, Dr. J. Street Brewer reported that the committee had not been able to find a man to recommend to the Society, and suggested that the committee be enlarged to include members from the areas around Charlotte, Asheville, Greensboro, and Winston-Salem. President Coppridge appointed to the committee Dr. Frank A. Sharpe of Greensboro, Dr. Monroe Gilmour of Charlotte, Dr. Lenox Baker of Durham, and Dr. Zack D. Owens of Elizabeth City.

Dr. D. I. Rose read the report of Dr. Papineau, chairman of the Insurance Committee. The report was accepted and filed.

President Coppridge then brought up the matter of relations between the Veterans Administration and the Society. The reasons for the dissatisfaction concerning the veterans home-town medical care program were discussed, and it was decided that a committee should be appointed to work with the Hospital Saving Association in familiarizing the doctors of the state with the requirements of the program. President Coppridge appointed on the committee Dr. E. McG. Hedgpeth, Dr. E. I. Bugg, and Dr. Alexander Webb.

Dr. Karl B. Pace suggested that the Society sponsor a plan for group automobile liability insurance for its members. This matter was referred to the Insurance Committee.

President Coppridge then declared the meeting adjourned, at 3:10 p.m.

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## MINUTES OF THE EXECUTIVE COMMITTEE MEETING

**December 1, 1946**

The Executive Committee of the Medical Society of the State of North Carolina met at the Hotel Sir Walter in Raleigh on December 1, 1946, and was called to order at 3:20 p.m. by the president. The following members were present:

**Officers:**

Dr. William M. Coppridge, Durham, President
Dr. Frank A. Sharpe, Greensboro, President-Elect
Dr. James B. Bullitt, Chapel Hill, Second Vice President
Dr. Roscoe D. McMillan, Red Springs, Secretary-Treasurer

**Councilors:**

Dr. John Cotten Tayloe, Washington, Second District
Dr. Newsom P. Battle, Rocky Mount, Fourth District
Dr. M. D. Hill, Raleigh, Sixth District
Dr. J. H. McNeill, North Wilkesboro, Eighth District
Dr. I. E. Shafer, Salisbury, Ninth District
Dr. D. M. McIntosh, Sr., Old Fort, Tenth District

Secretary McMillan read a letter from Mr. Sample B. Forbus, temporary chairman of the committee on the training and registration of practical nurses, requesting that the State Medical Society allocate $80 to the North Carolina Committee of the National Association for Practical Nurse Education. Upon motion, duly seconded and carried, the secretary-treasurer was instructed to send the $80.

Secretary McMillan then brought up the matter of the remission of dues of members in the armed forces. Dr. Bullitt offered the following motion, which was seconded and carried unanimously: "Resolved, that the Executive Committee of the Medical Society of the State of North Carolina recommend to the House of Delegates of the Society that any member of the Society serving in the armed forces of the United States during the war be relieved of the obligation of paying dues to the Society during the period of his military service and for six months thereafter, provided that a part of a year in military service be counted as a year."

Secretary McMillan then stated that Dr. Paul F. Whitaker had resigned from the Medical Care Commission on account of his health, and that Governor Cherry had asked the State Medical Society to supply him with the names of three men, from whom he will select a man to fill the place left vacant by Dr. Whitaker's resignation. The following nominations were offered: Dr. J. Street Brewer of Roseboro, Dr. Donnell B. Cobb of Goldsboro, and Dr. G. G. Dixon of Ayden.

Dr. Sharpe moved that the Executive Committee authorize the secretary to arrange obituary services for Dr. Paul McCain at a suitable time as part of the program for the annual meeting of the Society. The motion was seconded and carried.

At the suggestion of President Coppridge, the following motion was offered by Dr. Battle, seconded by Dr. Tayloe, and carried: "Resolved, that a certain amount of money be appropriated, to be determined by the Finance Committee, for the purpose of reimbursing in part the expenses of the committees of the Society for telegraph and telephone communication, etc."

President-Elect Sharpe suggested that the matters of the veterans' dues and the time of the president's address to the annual meeting be referred to the By-Laws Committee.

Secretary McMillan announced that the next annual meeting would be held in Winston-Salem on April 28, 29, and 30, at the Robert E. Lee Hotel, and the meeting adjourned at 4:25 p.m.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA

The School of Medicine of the University of North Carolina has accepted a grant from the Cinchona Products Institute, New York, for continuance of the work of Dr. Edwin P. Hiatt on the effects of quinine and other cinchona alkaloids upon renal function and blood pressure.

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Portraits of Dr. James B. Bullitt and Dr. W. deB. MacNider were formally presented to the University in a simple ceremony on Sunday afternoon, December 15. The portraits, which will hang in the Medical School Library, were the gifts of alumni and friends of the school. During the meeting, which was presided over by Dr. George Carrington, president of the University Medical Alumni Association, brief tributes were paid to Dr. Bullitt by Dr. Hugh Smith of Greenville, South Carolina, and to Dr. MacNider by Dr. W. M. Coppridge of Durham, North Carolina. Chancellor R. B. House accepted the portraits in the name of the University. An informal tea followed the ceremonies.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

Dr. Eugene A. Stead assumed his duties as Professor of Medicine at the Duke University School of Medicine on January 1, 1947, filling the professorship held by the late Dr. Frederic M. Hanes.

* * * *

Under the direction of Dr. Norman C. Conant, the Fungus Disease Registry is increasingly active. This registry supplies sets of teaching cultures for medical schools and maintains a diagnostic service that includes culture, histopathologic, and serologic studies. The service is financed by a grant from the American Foundation for Tropical Medicine. A month's course in mycology is to be offered by this department during the summer of 1947. The exact date will be announced later.

* * * *

At the meeting in Philadelphia of the Association of Medical Illustrators, Elon H. Clark was elected chairman of the Board of Governors, and Orville A. Parks was appointed chairman of the Southeastern Division.

* * * *

Dr. George A. Watson of the Department of Pediatrics received a scholarship for the fall Graduate Instructional Course in Allergy at Jefferson Medical School, Philadelphia.

* * * *

A special medical research building, making available 22,000 feet of animal and laboratory space, is now well along in construction and should be ready for occupancy about March 1.

* * * *

As an experiment in graduate teaching, the Department of Anatomy is offering a review of anatomy on a graduate level using motion pictures, lantern slides, and other visual aids. This review is offered as a part of the specialty program in neuropsychiatry and orthopedics. The course is conducted as round-table discussions with panels including staff clinicians especially interested in the region of anatomy under discussion.

* * * *

Dr. Raymond S. Crispell left Duke University on November 4 to assume the post of director of the Division of Neuropsychiatry for Branch 5 of the Veterans Administration, with headquarters in Atlanta Georgia. He will also be connected with the Emory University School of Medicine and the Georgia School of Technology.

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

Announcement was made on January 2 of the establishment of a $1,700,000 endowment fund by Mr. James A. Gray of Winston-Salem, the income of which will go to eleven North Carolina colleges. The principal beneficiary of the endowment fund is the Bowman Gray School of Medicine of Wake Forest College, which was awarded $900,000 of the amount.

* * * *

On December 29, 1946, Dr. C. C. Carpenter, Dean, announced a gift of $60,000 from Mrs. Nathalie Gray Bernard. This fund is to be used in further support of the development of the Department of Neuropsychiatry. Mrs. Bernard had previously given Graylyn Estate, valued at $1,000,000, to be used for that purpose, and her son, Gordon Gray had previously made a gift of $125,000 to support the development of psychiatry.

Dean Carpenter also announced faculty changes that have been made during the year 1946. These consisted of the addition of twenty new members to the faculty; the return of two from a year's leave of absence; the return of five from the armed services; and the promotion of five others.

Those elected to the faculty during the year were:

Dr. Thomas Blair, Assistant Professor of Periodontia and Oral Surgery.
Dr. Richard R. Bobb, Instructor in Physiology and Pharmacology.
Miss Martha Chilton, Instructor in Bacteriology.
Dr. Elizabeth Conrad, Assistant in Clinical Pediatrics.
Dr. W. Eugene Cornatzer, Assistant Professor of Biochemistry.
Dr. H. Francis Forsyth, Instructor in Orthopedics.
Dr. MacDonald Fulton, Associate Professor of Bacteriology and Director of Department.
Dr. Mary I. Griffith, Instructor in Obstetrics and Gynecology.
Dr. Richard A. Groat, Assistant Professor of Anatomy in Charge of Neuroanatony and Histology.
Dr. Douglas M. Kelly, Associate Professor of Neuropsychiatry.
Dr. Weston M. Kelsey, Instructor in Pediatrics.
Dr. Janet Mackie, Assistant Professor of Preventive Medicine.
Dr. Thomas T. Mackie, Professor of Preventive Medicine and Chairman of the Division of Medicine.
Dr. Richard L. Masland, Assistant Professor of Neuropsychiatry.
Dr. Manson Meads, Instructor in Medicine.
Dr. Charles H. Reid, Assistant in Medicine.
Dr. Riley E. Spoon, Instructor in Dental Surgery.
Dr. Joseph B. Stevens, Assistant in Medicine.
Dr. Marjorie Swanson, Instructor in Biochemistry.
Dr. Lloyd J. Thompson, Professor of Neuropsychiatry and Director of the Department of Neuropsychiatry.

Those returning from leaves of absence are:

Dr. E. S. King, Professor of Bacteriology.
Dr. James F. O'Neill, Assistant Professor of Surgery and Director of the Department of General Surgery.

Those returning from the armed services are:

Dr. George E. Bradford, Assistant in Clinical Otorhinolarnyngology.
Dr. John P. Davis, Assistant in Clinical Medicine.
Dr. William H. Flythe, Assistant in Clinical Medicine.
Dr. C. Hampton Mauzy, Assistant Professor of Obstetrics and Gynecology.
Dr. John F. Marshall, Instructor in Surgery.

Those promoted, with their former and present titles, are as follows:

Dr. George T. Harrell, Jr., formerly Associate Professor of Medicine and Director of the Department; now Professor of Medicine and Director of the Department.
Dr. Frank R. Lock, formerly Associate Professor of Obstetrics and Gynecology and Director of the Department; now Professor of Obstetrics and Gynecology and Director of the Department.
Dr. Robert P. Morehead, formerly Associate Professor of Pathology and Director of the Department; now Professor of Pathology and Director of the Department.
Dr. Robert B. Lawson, formerly Assistant Professor of Pediatrics; now Associate Professor of Pediatrics.
Dr. J. Maxwell Little, formerly Assistant Professor of Physiology and Pharmacology; now Associate Professor of Physiology and Pharmacology in charge of Pharmacology.

## WATTS HOSPITAL SYMPOSIUM

The Fourth Annual Medical and Surgical Symposium sponsored by the staff of Watts Hospital will be held in Durham on February 12 and 13. The program is as follows:

**Wednesday, February 12, 1947**

11:00 a.m. Clinico-Pathological Conference, presented by Sidney Farber, M.D., Department of Pathology, Harvard Medical School, Boston, Mass., and Charles D. May, M.D., Associate in Pediatrics, Harvard Medical School, Boston, Mass.
2:30 p.m. "Surgical Aspects of Diabetes", Leland S. McKittrick, M.D., Boston, Mass.
3:30 p.m. "Recent Advances in the Study and Treatment of Diabetes", Howard F. Root, M.D., Boston, Mass.
8:00 p.m. "Viral Hepatitis", Joseph Stokes, Jr., M.D., Professor of Pediatrics, University of Pennsylvania Medical School, Philadelphia, Pa.
9:00 p.m. "Pericardial Scars", Francis C. Wood, M.D., Assistant Professor of Medicine, University of Pennsylvania Medical School, Philadelphia, Pa.

**Thursday, February 13, 1947**

11:00 a.m. Clinico-Pathological Conference, presented by J. E. Ash, Colonel, Medical Corps, Director, Army Institute of Pathology, Washington, D. C., and Wallace Yater, Former Professor of Medicine at Georgetown University.
2:30 p.m. "Some Clinical and Physiologic Aspects of Portal Cirrhosis", Albert M. Snell, M.D., Mayo Clinic, Rochester, Minn.
3:30 p.m. "The Current Status of Calcium Penicillin in Beeswax and Peanut Oil", Monroe J. Romansky, M.D., George Washington University School of Medicine, Washington, D. C.
8:00 p.m. "The Present Status of Effective Specific Therapy Based on Exact Hematologic Diagnosis", Charles A. Doan, M.D., Dean, College of Medicine, Ohio State University, Columbus, Ohio.

## NORTH CAROLINA MEDICAL CARE COMMISSION

### Resolution on the Resignation of Dr. Paul F. Whitaker

**Whereas**, as a necessary safeguard to his own health Dr. Paul F. Whitaker of Kinston has found it necessary to resign as a member of our North Carolina Medical Care Commission, and

**Whereas**, it is fitting that other members of the Commission formally give expression to the high regard and sincere affection with which all of us have come to regard Dr. Whitaker and our deep regret that he is no longer an active and official comrade with us in our efforts to improve health and hospital conditions for the sick and suffering of our state. No nobler expression of that purpose has ever been made than his humane and spiritual statement on "Hospital and Medical Needs of North Carolina," presented in 1944 to Governor Broughton, Governor-Elect Cherry, and the Advisory Budget Commission, revealing his deep understanding of the state's health problems and a militant faith in our capacity to cure these ills.

As chairman of our Committee on a Four-Year Medical School, Dr. Whitaker worked with ability, patriotism and zeal far beyond the mere line of duty, imperiling his own strength and health in order to render the full service called for by his own extreme conscientiousness and deep love for his own fellow men. Rich indeed will be the traditions of the North Carolina Medical Care Commission if each of the rest of us may leave behind a record marked in any such degree by the combined powers of a fine brain, a great heart, and untiring industry. Therefore be it

**Resolved,** that a copy of this resolution be spread on our minutes and that a copy be sent to Dr. Whitaker as an expression of our appreciation of all his past service, and as a further expression of our hope that we may continue to have the benefit of his interest, counsel and such active service and co-operation as he finds it possible to give.

Respectfully submitted,
CLARENCE POE.

## FIFTH DISTRICT MEDICAL SOCIETY

The Fifth District Medical Society met in Hamlet on December 3. Speakers for the afternoon program were Drs. W. D. James, Jr., and Charles W. Brown of Hamlet, Dr. Frank Ward of Lumberton, and Drs. E. Garland Herndon and Charles M. Gillikin of Winston-Salem. Dr. W. M. Coppridge, Mr. Carl Goerch, and Dr. Roscoe D. McMillan spoke at the dinner meeting. Officers elected for 1947 were Dr. C. O. Bristow of Rockingham, president; Dr. A. A. James of Sanford, vice president; and Dr. Hugh McAllister of Lumberton, secretary and treasurer.

## ALAMANCE-CASWELL COUNTIES MEDICAL SOCIETY

Dr. W. E. Cook of Mebane was elected president of the Alamance-Caswell Counties Medical Society for 1947, succeeding Dr. Emmett Lupton of Graham. Other officers elected at a meeting held on December 10 were Dr. George W. Lawson of Graham, vice president, and Dr. A. W. Simmons of Burlington, secretary-treasurer. Drs. D. E. Robinson and F. T. Harper of Burlington were elected delegates to the State Society meeting, and Dr. J. C. Wilkins of Haw River and Dr. M. S. Dickson of Burlington, alternates. The 1947 Board of Censors consists of Dr. S. F. Scott of Union Ridge, Dr. G. T. McLamb of Mebane, and Dr. J. H. Cutchin of Saxapahaw.

## ASHE-WATAUGA COUNTIES MEDICAL SOCIETY

The second meeting of the newly organized Ashe-Watauga Counties Medical Society was held December 11 at the Ashe Memorial Hospital in Jefferson. Dr. Robert R. King, Jr., was elected delegate to the State Medical Society meeting and Dr. H. B. Perry, Jr., alternate. A committee was appointed to make recommendations for by-laws for the society.

## CATAWBA VALLEY MEDICAL SOCIETY

A dinner meeting of the Catawba Valley Medical Society was held at the Newton Kiwanis Hall on December 10. The program consisted of Catawba County fried ham, brown gravy, and hot biscuit, in addition to papers by Dr. Frank Lock of Winston-Salem and Dr. Paul Kimmelstiel of Charlotte. The Newton-Conover Medical Association were hosts for the occasion.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

Officers of the Edgecombe-Nash Counties Medical Society for 1947, elected at the December meeting of the society, are as follows: President, Dr. D. L. Knowles; first vice president, Dr. S. E. Way; second vice president, Dr. J. F. Crumpler; secretary-treasurer, Dr. K. D. Weeks; editor, Dr. S. H. Justa; delegates to the State Society, Drs. Henry Cutchin and J. H. Raby; alternate delegates, Drs. A. L. Daughtridge and C. W. Bailey. Dr. A. T. Thorp was reelected to the board of censors, and Dr. Jane Morrow was voted in as a new member of the society.

Dr. H. N. Cole presented a paper on "Bone Marrow Studies," with lantern slides.

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. Samuel A. Vest, professor of urology at the University of Virginia, was guest speaker at a dinner meeting of the Forsyth County Medical Society, held on December 10. His subject was "Carcinoma of the Prostate." Dr. J. H. McNeill of North Wilkesboro discussed health legislation to be presented before the 1947 General Assembly.

Dr. Paul A. Yoder was elected president of the society, succeeding Dr. Fred Garvey. Dr. J. P. Davis was named first vice president and Dr. O. J. Hart, second vice president. Drs. J. R. Bender and Fred G. Pegg were re-elected secretary and treasurer, respectively. Dr. J. F. Marshall was named to the board of censors, succeeding Dr. H. M. Starling.

## PITT COUNTY MEDICAL AND DENTAL SOCIETY

The Pitt County Medical and Dental Society held its annual ladies night meeting December 12 at the Rotary Club Building in Greenville. The meeting was well attended.

Dr. F. P. Brooks, the retiring president, extended a welcome to the doctors' wives. Mrs. D. L. Moore responded.

Dr. J. M. Mewborn of Farmville was installed as the new president of the society, and in his remarks of acceptance took occasion to mention the fine relationship existing between the local health department and the physicians and dentists of Pitt County. After the installation of the president the meeting became a social affair.

Dr. B. McKay Johnson of Greenville is the new vice president, and Dr. F. F. Irons of Greenville, secretary and treasurer. The hosts, Drs. Fred Irons, Maline Irons, E. B. Aycock, D. B. Armistead and Dan Wright, provided a banquet for the occasion.

## WAKE COUNTY MEDICAL SOCIETY

Officers of the Wake County Medical Society for 1947 are Dr. C. T. Wilkinson of Wake Forest, president; Dr. A. G. Crumpler of Fuquay Springs, vice president; and Dr. Joseph Hitch of Raleigh, secretary-treasurer. The retiring president is Dr. Robert L. McGee of Raleigh.

### Winthrop Increases Productions of Synthetic Amino Acids

Increased production of synthetic amino acids is made possible by new methods of preparation developed in the laboratories of the Winthrop Chemical Company Inc.

## Seaboard Medical Association

The fifty-first annual meeting of the Seaboard Medical Association was held in Kinston, December 3-5, 1946, with Dr. Thomas Leslie Lee of Kinston presiding. Other retiring officers were Dr. C. P. Jones, Jr. of Newport News, Dr. Alban Papineau of Plymouth, Dr. Cora Z. Corpenning of Virginia Beach, and Dr. H. H. Foster, Norlina. Dr. Paul F. Whitaker of Kinston headed the executive committee.

Officers elected for 1947 are Dr. O. R. Yates of Suffolk, Virginia, president; Dr. D. H. Bridger of Bladenboro, first vice president; Dr. Walter P. Adams of Norfolk, second vice president; Dr. Charles H. Lupton of Norfolk, third vice president; and Dr. Clarence Porter Jones, Sr., of Newport News, re-elected secretary-treasurer for the thirty-eighth year.

## News Notes

Dr. John E. G. McLain has opened an office in Wilson for the practice of general medicine and diseases of the chest.

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Broadoaks Sanatorium in Morganton has announced the association of James Taylor Vernon, M.D., recently released from active duty with the medical corps of the army of the United States, on the medical staff of the sanatorium.

* * * *

Dr. Ralph V. Ellis of Greensboro has announced the limitation of his practice to allergic disorders.

## American College of Surgeons

The following North Carolina surgeons were received into fellowship in the American College of Surgeons at the Convocation held December 20, during the Clinical Congress in Cleveland:

Charles H. Ashford, New Bern; James S. Brown, Jr., Hendersonville; John T. Codnere, Asheville; Richard B. Dunn, Greensboro; Eleanor B. Easley, Durham; Julian E. Jacobs, Charlotte; Harold B. Kernodle, Burlington; Joseph T. Kerr, Wilson; Harold C. McDowell, Winston-Salem; Alexander S. Moffett, Banner Elk; Richard L. Pearse, Durham; Winfield L. Thompson, Goldsboro; Felix B. Welton, Whiteville; George T. Wood, Jr., High Point.

## The Southeastern Surgical Congress

The fifteenth annual assembly of The Southeastern Surgical Congress will be held in Louisville, Kentucky, at the Brown Hotel, on March 10, 11, and 12, 1947. North Carolina doctors appearing on the program are Dr. R. B. McKnight of Charlotte and Dr. Thomas L. Lee of Kinston.

## Postgraduate Course in Radiology

One hundred radiologists will be selected to attend the postgraduate courses in radiology to be conducted March 30 through April 4 in Philadelphia by the American College of Radiology. Preference will be given to radiologists who served in World War II. Second preference will be given to qualified applicants who were unable to obtain admission to last year's course in Philadelphia. The course is sponsored jointly by the American College of Radiology and the Philadelphia Roentgen Ray Society.

## National Conference on Medical Service

The Twentieth Annual Meeting of the National Conference on Medical Service will be held at the Palmer House, Chicago, Illinois, on February 9. Registration will commence at 9 a. m. and the program will include discussions in the fields of national affairs, economics and medical education. All physicians are invited to attend; there is no registration fee. Dr. Cleon A. Nafe, Indianapolis, is President of the Conference and Creighton Barker, New Haven, is the Secretary.

## Civil Service Examination

Mr. E. S. Burrows, Deputy Regional Director of the Fourth United States Civil Service Region, has announced an examination for the position of Medical Officer with the Fourth Civil Service Region. The position is located in the office of the director of the region, in Winston-Salem, and the salary is $7102.20. The duties are mainly in the field of administrative medicine, and the position is closely connected with the U. S. Civil Service Commission's program for the placement of physically handicapped persons in government jobs.

Copies of the announcement and applications may be obtained from the Secretary, Board of U. S. Civil Service Examiners at any first or second-class post office, or from the director of the Fourth U. S. Civil Service Region, Winston-Salem, N. C.

## American Board of Ophthalmology

A directory of all diplomates to January 1, 1947, will be published shortly after that date. This directory will be arranged alphabetically and geographically. No biographical material will be included.

Every effort will be made to make this directory accurate. Diplomates who have not already done so should notify the Board office at Cape Cottage, Maine, at once, stating their name and address exactly as they wish them listed.

The price is $3.00 postpaid.

## Directory of Convalescent Homes

The Committee on Public Health Relations of The New York Academy of Medicine is preparing a new edition of the "Directory of Convalescent Homes in the United States," to be published by the Sturgis Fund of the Winifred Masterson Burke Relief Foundation of White Plains, New York. The last issue of this Directory was published by the Sturgis Fund in 1931 under the auspices of the Committee on Convalescent Care of the American Conference on Hospital Service and has long been out of print. The need of a new directory is recognized by all concerned.

Early in January, a questionnaire will be distributed to all recognized convalescent homes maintained by municipalities, counties, or voluntary bodies. The information sought deals with the physical plant, the staff, the requirements for admission, the type of patients, therapy, and such other matters as will make the Directory a dependable guide for physicians who wish to refer their patients to institutions for convalescence. The questionnaire is so devised that it can be filled out with a minimum of effort. Convalescent homes that do not receive a questionnaire are urged to request one by writing to E. H. L. Corwin, Executive Secretary, Committee on Public Health Relations, The New York Academy of Medicine, 2 East 103rd Street, New York 29, New York.

## NATIONAL MENTAL HEALTH FOUNDATION

The National Mental Health Foundation announces that it has completed the production of its electrically-transcribed series of radio programs entitled, "For These We Speak—." These eight plays dealing with various aspects of mental illness are now available for sponsorship over local radio outlets by mental hygiene societies and similarly concerned organizations.

Although the purpose of these programs is didactic, there is no haranguing: the "message" of each play is inherent in its dramatic treatment. Brief introductory remarks by such personages as Helen Hayes, Mrs. Franklin D. Roosevelt, Mary Jane Ward and Dr. Harry Emerson Fosdick serve to arouse the listeners' curiosity concerning the play which follows.

Mental hygiene societies, public health agencies, and the civic organizations desiring to assist in the sponsorship of this series over radio stations in their communities are invited to address their inquiries to the Radio Section of the National Mental Health Foundation, Box 7574, Philadelphia 1, Penn.

## THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS, INC.

The newly produced motion picture, "A New Horizon," filmed by RKO-Pathe for The National Foundation for Infantile Paralysis and approved by the American College of Surgeons, is now available for the medical profession. The film depicts a complete physical therapy department and shows the way in which it is utilized in the modern hospital.

The 16 mm. sound prints of this film can be secured on a loan basis or purchased, the price being $21.00. Address The National Foundation for Infantile Paralysis, 120 Broadway, New York 5, N. Y.

**Renal Hypertension.** By Eduardo Braun-Menendez, Juan Carlos Fasciolo, Luis F. Leloir, Juan M. Munoz and Alberto C. Taquini of the Institute of Physiology, Faculty of Medical Sciences and Institute of Cardiology, V. F. Greg Foundation, Buenos Aires, Argentina. Translated by Lewis Dexter, M.D. 451 pages with 93 figures. Price, $6.75. Springfield, Illinois: Charles C. Thomas, 1946.

When Dr. Harry Goldblatt and his collaborators found a method by which hypertension could be produced in animals, he redirected the attention of the medical world to the problem of hypertension. This discovery was made in 1934. The renewed interest in hypertension which it created is reflected in the medical literature by the large number of papers dealing with the subject. This monograph represents the attempt to summarize the accomplishments of these investigations of the past decade.

The book deals in a general manner with the various types of hypertension, but goes into detail regarding increased blood pressure arising as the result of renal ischemia. The first portion of the book is devoted to a consideration of the experimental production of the condition. Pathologic physiology and anatomy are discussed. The "renin plus hypertensinogen equals hypertensin" concept is fully elaborated. Detailed treatment is accorded each of the factors entering into the equation. Accessory substances are considered. The second portion of the book is concerned with human hypertension, and includes sections on classification, mechanism, and treatment. The relation between human and experimental hypertension is taken up in the last portion of the book. A comprehensive bibliography of some 1238 articles is appended.

**Renal Hypertension** is an excellent monograph. The reader is afforded an authoritative, comprehensive, and yet readable summary of the present status of this important problem. The authors are to be congratulated on their abilities to sift the work, some of it their own, and present it in an almost unbiased manner. The style is free and each section is followed by a summary. The publishers have turned out another example of their usual fine workmanship.

**Practical Malariology.** Prepared under the Auspices of the Division of Medical Sciences of the National Research Council. Paul F. Russell, M.D., M.P.H., Colonel, M.C., A.U.S., Parasitology Divn., Army Med. Sch. Field Staff, Internl. Health Divn., Rockefeller Foundation (on leave); Luther S. West, Ph.D., Head of Biology Dept., Northern Michigan College of Education. Major, Sn.C., A.U.S. (Reserve); Formerly Entomologist, Parasitology Division, Army Medical School; Reginald D. Manwell, Sc.D., Professor of Zoology, Syracuse University, New York. Formerly Captain, Sn.C., A.U.S., Protozoology Section, Parasitology Division, Army Medical School. Foreword by Raymond B. Fosdick, President of The Rockefeller Foundation. 684 pages, 238 illustrations, 8 in color. Price, $8.00. Philadelphia and London: W. B. Saunders Company, 1946.

This volume of 684 pages, prepared under the auspices of the Division of Medical Sciences of the National Research Council, was published as one of the series of Military Medical Manuals. As the authors point out in the preface, it was "written primarily from the standpoint of civilian needs. It is, therefore, not a military manual in a restricted sense."

This book is unique in its field. In the textual discussion and by reference to critically chosen source material it provides essential information to everyone interested in or concerned with malaria, be he clinician, public health worker, entomologist, protozoologist, sanitary engineer or the more casual reader who desires to familiarize himself with the manifold ramifications of the broad field of malariology. The literary style is as excellent as the scientific content; the result is a text of unusual interest, value and readability.

The book is arranged in six well-balanced sections: the parasite, the mosquito, the man, the community, prophylaxis and control, and a brief section on therapeutic malaria. Detailed keys to the anophelines of the world and tables of equivalents are included as appendices. An excellent index provides easy and rapid reference. The volume is profusely illustrated, and the illustrations are informative and well chosen.

The universal usefulness of the manual is perhaps its outstanding feature. In the section on the parasite there is, in addition to the descriptions of morphology, physiology and life cycles, much of value for the laboratory research worker. The section on the malaria vectors provides in tabular form the geographic distribution of important anophelines and the characteristic habitats of the different species. It also contains much of great value to the laboratory worker, including mounting techniques and management of insectaries for the laboratory rearing of mosquitoes. The discussion of the clinical phenomena of malaria in man is clear, concise, and sufficiently complete; and the discussion of therapy is critical and completely up to date. The presentation of the epidemiology of malaria and the problems of prophylaxis and control, for both civilian and military populations, is a splendid exposition of current knowledge gleaned in many parts of the world. The descriptions of various control measures and the evaluation of their limitations and usefulness make this section invaluable for the individual engaged in malaria control operations.

This volume cannot be too highly recommended to all who are interested in the diverse problems presented by malaria, "the greatest single threat to human health" when the world as a whole is considered.

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**Muscle Testing—Techniques of Manual Examination.** By Lucille Daniels, M.A., Director and Associate Professor of Physical Therapy, Stanford University; Marian Williams, M.A., Assistant Professor of Physical Therapy, Stanford University; and Catherine Worthingham, M.A., Director of Professional Education, The National Foundation for Infantile Paralysis, Inc. Designed and Illustrated by Harold Black with 349 Diagrammatic Line Drawings. 189 pages. Price, $2.50. Philadelphia and London: W. B. Saunders Company, 1946.

In this book the authors have correlated all the methods of testing muscles since Dr. Robert W. Lovett originated the gravity tests in 1912, and have worked out a practical method of testing the prime movers in relation to the principal joints of each segment of the body. Gravity and resistance are still used as the basis for manual testing, but muscle spasm, contractures, and other factors prohibiting the full arc of motion in certain instances are also recognized.

The muscle chart which is supplied by the National Foundation for Infantile Paralysis for early muscle testing is used. The authors give, for each joint of the body, the origin, insertion, nerve supply, range of motion, factors limiting motion, fixation and accessory muscles of all the muscles which are prime movers of that joint, and the positions for testing these muscles from trace to normal.

This volume is superior to previous books on the subject in that the writers have utilized the experience gained by other systems of muscle testing, and have worked out a plan by which physical therapists in different parts of the country can obtain fairly constant and accurate muscle evaluations. Each testing position is well illustrated, so that the beginner should have little trouble with her first experiences in muscle testing without supervision. Blank spaces are left for the experienced therapist to add her own notes.

This is a valuable book, not only for doctors and physical therapists, but also for occupational therapists, physical educators, and anatomy instructors in medical schools in teaching kinesiology. It is the best illustrated and most compact book that has been published on the technique of manual examination and proper evaluation of muscle strength.

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# In Memoriam

## PAUL PRESSLY McCAIN, M.D.

Mr. Chairman and members of the North Carolina Medical Care Commission, the pale horse and his rider have passed this way and another light has gone out. North Carolina lost an outstanding and valuable citizen and the medical profession one of its most distinguished members in the sudden, tragic, and untimely death of Paul Pressly McCain on November 25, 1946.

Doctor McCain was a man of unusual ability, enthusiasm, inquisitive mind, and great intellect coupled with a sincere desire to render altruistic service to his fellowmen. He occupied a very high place in the esteem of those who worked with him and knew him well.

His stewardship as superintendent of the state's tuberculosis hospitals and the great interest he manifested in his patients over many years was responsible primarily for a great reduction in mortality and morbidity rates from tuberculosis in the state of North Carolina. That his people were acutely conscious of his great contributions is attested by the fact that he was signally honored by his profession and his state a number of times.

As a public-spirited citizen, he was always willing and anxious to help with any program which seemed to be for the best interests of his people. It was on a mission of service to his profession and his state that the catastrophe came which ended his career.

A devoted husband and father; a kind, generous, and understanding friend; a Christian gentleman has gone from among us. To have known and been associated with him was a benediction. The world is better as a result of his having passed this way. We shall not soon forget him. The results of his splendid service to humanity and the influence of his inspiring personality and life will live on.

Be it resolved that this tribute be made a part of the permanent record of the North Carolina Medical Care Commission and that a copy be sent to Mrs. McCain and to the Secretary of the Medical Society of the State of North Carolina.

Respectfully submitted,
FRED C. HUBBARD, M.D.

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CITY ____________
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# NORTH CAROLINA MEDICAL JOURNAL

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## TREATMENT OF THE ACUTE NASAL AND SINUS INFECTION

O. E. VAN ALYEA, M.D.

CHICAGO, ILLINOIS

Modern rhinology is constantly undergoing major changes as our knowledge of nasal physiology and histopathology increases. The more we learn of nasal function, the more importance we attach to the nose as an organ of defense. The membranes which line the nasal and sinus cavities are equipped with mechanisms which act primarily to prevent invasion by pathogenic organisms, and in the event of invasion by such organisms, act secondarily to throw them off. Pathogens gain a foothold in the nasal mucosa only when a breakdown in the muco-ciliary stream eliminates the protective film of mucus, at least in spots.

By far the most common means of disrupting this defense mechanism is body-chilling. This produces intranasal vasoconstriction, with lowered temperature and a blanching of the membranes which cover the intranasal structures. As the circulation is diminished, there is a cessation of glandular activity; the nose becomes dry and the cilia cease to beat.

A return of intranasal function will occur with the application of heat, either locally or to the periphery; or, if the individual's resistance is good, a compensatory action reestablishes nasal function in ten to twenty minutes in spite of continued exposure to cold.

### *General Measures*

All writers are agreed that patients with acute rhino-sinusitis do better when put to bed in a warm, well moistened room, and that simple common-sense treatment hastens recovery and prevents complications. Energetic local treatment and the use of laxatives are avoided, but measures to increase the comfort of the patient are introduced early and maintained throughout the course of the disease. Codeine and other drugs are used for relief of pain, and decongestants are instilled or packed into the nose to enlarge the breathing space and to promote drainage.

### *Intranasal Medication*

As a result of the awakened interest in the ciliated mucosa as a defense membrane, medicaments now used in the nose are isotonic and non-detrimental to ciliary activity. They should also be non-irritating, with a *p*H slightly on the acid side. Many of the preparations which have enjoyed a wide usage in the past do not conform to these requirements. Included in this list are mild silver proteins and medicaments containing oil or any irritating drug.

The incorporation of sodium sulfathiazole in nose drops was unfortunate. Most such solutions are extremely irritating to the nasal mucosa, and have contributed much to the promotion and continuation of nasal and sinus infection. Happily, they are at last on the way out. The use of penicillin and other antibiotics in nose drops has proved disappointing. The administration of penicillin by inhalation is also of questionable value in acute infections.

Inhalants such as benzedrine have no therapeutic value. They afford temporary comfort and are apparently not harmful to

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the cilia, but Fabricant has found that a few whiffs elevate the pH of the nasal secretions. This increased alkalinity in itself tends to retard recovery.

Ephedrine, ½ of 1 per cent in saline solution, and some of the synthetic sympathomimetic drugs now available, such as neosynephrine, ¼ of 1 per cent, are effective nasal vasoconstrictors. The solution is best administered by instillation, with the patient in the head-low position of Proetz, or in the side posture described by Parkinson. A dropper-full of the solution is placed in each nostril, where it remains for thirty to sixty seconds. The sinus openings are reached with the patient in either position; drainage and ventilation are promoted, and the patient enjoys an increase in breathing space which may last several hours. It should be stressed, however, that vasoconstrictor drugs have a limited use in the treatment of nasal and sinus infections, and that in many cases they are actually harmful. There is a tendency among rhinologists to prescribe these solutions sparingly. They may be given to provide temporary relief in cases of extreme nasal blockage, but their prolonged use is discouraged, and seldom, if ever, are they indicated in chronic infections.

### *Displacement (Proetz) therapy*

This method of sinus irrigation is not advocated for use in the early acute stages, and is most effective in persistent acute or chronic cases.

### *Nasal packs*

Tampons saturated with mild silver protein solution (argyrol or neosilvol), known as Dowling packs, have enjoyed a wide use in the treatment of all stages and varieties of nasal and sinus disease during the past several years. These packs are harmful in the acute stages and are of no value in the chronic stage. In subacute infections their irritating action produces a flow of mucus, which some think of value. The same effect could be produced by a few whiffs of snuff, however. The principal objection to the routine use of argyrol packs is that physicians who commonly use this method apply it to all cases, regardless of the diagnosis, and as a consequence are prone to develop loose diagnostic habits. Far better is the practice of first determining as nearly as possible the exact location of the infection, and then directing all attention to that area—not to the nose in general.

In acute infection, packs saturated with a weak solution of cocaine (1 per cent) or ephedrine may be inserted in the middle meatus while the patient receives infra-red therapy for twenty to thirty minutes. This procedure combines two non-irritating therapeutic measures and affords temporary relief, particularly in the cases of acute congestion associated with pain.

## *Internal Medication*

The sulfonamides and penicillin taken internally have proven of little value in uncomplicated upper respiratory infections, or in those without fever. For this reason, and because of their masking effect, the routine use of these drugs in the treatment of acute sinusitis is inadvisable. They have, however, been found to be of value in upper respiratory infections with complications and may be used effectively in cases of acute spreading infection with impending intracranial complications.

### *Vitamin therapy*

Large doses of vitamin C have been found to be of distinct aid in the early stages of acute upper respiratory infections. The dosage recommended is 1 Gm. per day.

### *Foreign protein therapy*

Injections of foreign protein are followed by reparative cellular changes, and may be given daily with effective results.

## *Physical Therapy*

The instruments of physical therapy which have been perfected largely since World War I have, during the past few years, been applied with some reported success in the treatment of diseases of the nasal sinuses. Various claims made from time to time by proponents of physical therapeutic measures, however, do not always stand the test of carefully controlled experiments.

The enthusiasm so often evidenced with the advent of new forms of therapy, instruments, and techniques is often based on exaggerated claims by the author or designer, who is unable to back them up.

### *Thermotherapy*

Heat applied to the face has been found to be of distinct value in the early stages of nasal or sinus infection. Used in the form of infra-red rays, it relieves pain and combats infection.

*Short-wave therapy*

It is generally thought that short-wave diathermy is helpful, when employed with other therapeutic measures. Little may be expected from its use alone; for, so far as is known, it has no physiologic effects other than those attributable to heat.

*Roentgen therapy*

This is used in the acute cases to relieve pain and is thought by some to be of aid in combatting infection. This form of therapy, like the others described above, is at best only an ancillary measure. Little improvement may be expected when any form of physical therapy is used alone in the treatment of sinus disease.

### *Other Intranasal Procedures*

*Fracture of the middle turbinate*

In many cases of acute inflammatory conditions involving the anterior group of sinuses, the middle turbinate completely blocks the drainage outlets. This obstruction may still exist after the acute swelling has subsided. In these cases the middle meatus may be unblocked by fracture of the turbinate toward the septum. This simple operation is undoubtedly the most valuable single surgical procedure available in rhinology.

*Irrigation*

This is by far the most effective means of ridding a cavity of accumulated secretions. The importance of sinus drainage is more thoroughly appreciated when the nature of the inflammatory exudate is understood. The large numbers of polymorphonuclear leukocytes, or pus cells, present contain powerful proteolytic enzymes. The purpose of these enzymes is to dissolve phagocytized bacteria. In a stagnant exudate, however, such as may be found in the antrum, these pus cells disintegrate. The proteolytic enzymes which are released will irritate any tissue with which they come in contact. The extremely irritating action of these enzymes is illustrated by the maceration of the skin that takes place at the margin of drainage fistulas. The symptoms of toxemia which follow the absorption of these toxic products through the injured mucous membrane may be eliminated only by the removal of the exudate.

The question often arises as to how soon after the onset of an attack of acute sinusitis one may irrigate. No rule can be applied to all cases, because of the variable factors by which we should be influenced and guided. The attitude of the patient, his psychic make-up, and his natural resistance are determining factors. Some individuals resign themselves to their disease and are content to stay in bed and submit to palliative measures. Others are less patient and are not satisfied with milder methods of therapy. In these instances, and in those individuals who have had previous attacks, irrigation is the usual procedure as soon as the swelling of the tissues has subsided and the temperature has returned to normal. In the average nonallergic patient the acute swelling of the tissues usually begins to recede in two or three days. We may then expect an open ostium and a successful result from irrigation. Previous to that time, when swelling of the ostial lining and of the mucosa of the middle meatus completely or almost completely blocks the drainage area, irrigation does more harm than good by adding trauma to inflamed tissues without removing purulent material. Irrigation with pressure should not be carried out.

Irrigation of the *maxillary* sinus may be effected through the inferior or middle meatus. The natural route is becoming more popular each year as more rhinologists become acquainted with its possibilities. A common practice of many rhinologists at the present time is to attempt first to reach the sinus by way of the natural opening or an accessory opening; if these routes are not easily accessible, they carry out lavage through a puncture made in the membranous area of the middle meatus. Those who practice this technique rarely, if ever, find it necessary to break through the bony wall of the inferior meatus.

The *sphenoid sinus* may be irrigated through the natural ostium, which is accessible in 85 per cent of the cases, or through a puncture opening in the thin anterior wall. Acute sphenoiditis is scarcely ever recognized. An infectious process which involves this cavity usually includes other sinuses, and clinicians commonly overlook the sphenoid in their zeal to attack the more obviously infected cavities of the anterior group. In these cases the sphenoid demands attention only when treatment of the other sinuses fails to produce a cure.

The *frontal ostium* may be reached as easily as the ostia of the other cavities. Unfortunately, rhinologists in general fail to avail themselves of this fact, and many cases of frontal sinusitis which could have been cleared up with one or two irrigations are allowed to persist until the frontal sinuses become chronically suppurating cavities.

### *Emergency Drainage Openings*

Acute fulminating cases of sinusitis occasionally are of such a severe nature as to require immediate drainage. This statement applies particularly to infections of the frontal and sphenoid sinuses and less frequently to the antrum and ethmoids. In these fulminating cases irrigation by the usual methods is not feasible; tissue edema blocks the outlets and prevents a return flow of the irrigating solution. In case immediate removal of pus is deemed necessary, an opening should be made which is large enough to accommodate not only the intake and outflow of solution, but large clumps of exudate as well. This form of drainage is established through emergency trephine openings. In case the antrum is involved, the opening is made in the inferior meatus; in frontal sinusitis it is placed in the floor of the sinus through an external incision; and in case the infection is located in the sphenoid sinus, the opening is made in the anterior wall.

This form of treatment may be regarded in a sense as a life-saving measure, especially when applied to fulminating infections of the frontal or sphenoid sinuses. The procedure is carried out with a minimum of trauma and without further manipulation. Irrigation through the opening may not be necessary or advisable until the patient's resistance is increased and the temperature begins to recede.

Therapy with the sulfonamide drugs and penicillin may be of great help in severe sinus infections; yet cases are constantly reported which terminate fatally despite the judicious employment of these drugs. Patients with intracranial complications need the best available medical and surgical supervision, and all therapeutic measures may prove worthless if proper drainage of all involved sinuses is not established and maintained.

### *Summary and Conclusions*

In the early stages of an attack of acute nasal or sinus infection, the ideal treatment includes rest in bed in a warm, moist room. The patient's symptoms should be alleviated, and measures adopted which will tend to prevent complications and to hasten convalescence.

Vasoconstrictors are commonly prescribed for local use in all stages of acute nasal infections. Medications for this purpose should not be detrimental to ciliary activity and should have a $p$H between 5.5 and 6.5. A 0.5 per cent solution of ephedrine in normal saline fulfills these requirements. It is best administered by instillation, with the patient in a head-low position.

Tampons of mild silver protein having a $p$H above 8 are irritating to the nasal mucosa and have no place in the treatment of acute rhinitis or sinusitis. Five per cent sodium sulfathiazole solutions, with a $p$H of 10 or over, are mucosal irritants, and their local use for nasal and sinus infections should be discouraged.

Short-wave diathermy and roentgen therapy are ancillary forms of treatment which afford little more than symptomatic relief. Infra-red rays, injections of foreign protein, and vitamin C in large quantities have been proven to be beneficial in the treatment of patients suffering from acute rhinosinusitis in its early stage. Later, after the acute edema has subsided, available measures include fracture of the middle turbinate, the Proetz displacement treatment, and irrigation.

Irrigation of a sinus is the most effective means available for ridding the cavity of accumulated secretions. There is ample justification for instituting drainage when the exudate is extremely toxic. Irrigation may be carried out with comparative safety after the acute edema has receded. The procedure is then associated with less trauma, the drainage passageway is less likely to be blocked, and the tissues respond better to the removal of accumulated exudate.

Emergency openings are placed in the walls of sinuses in cases of severe infection, with serious complications or threatened complications. The establishment of immediate drainage, along with chemotherapy and the administration of penicillin, may be the means of producing a cure in a case which otherwise might have a fatal termination.

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# THE TREATMENT OF PEPTIC ULCER

## *With Special Reference to Acute Massive Hemorrhage*

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Except for certain complications requiring surgical intervention, the treatment of peptic ulcer during the past thirty years has passed largely into the hands of the medical man. Until recently we no longer considered operating merely because the patient could not or would not stay on his diet. When complications made partial gastric resection obligatory, we impressed on the patient both preoperatively and postoperatively that operation is not a cure-all, that marginal ulcers can develop even after a resection, and that a regimen of medical treatment for ulcer must be followed indefinitely.

### *Recent Developments in the Surgical Management of Peptic Ulcer*

Within recent years there have been developed two operative approaches, both aimed at reducing the hyperacidity of the stomach, which may offer a means of treating surgically the underlying condition which predisposes to peptic ulcers, instead of waiting for the so-called surgical complications to arise.

One of these operative approaches to the problem of gastric hyperacidity is an attempt to reduce the blood supply to the stomach by multiple arterial ligations. We have had no experience with this procedure, and have seen only one report in the literature.

The second of these approaches, with which we have had considerable experience, is the interruption of the vagus nerve supply as advocated by Dragstedt(1). While interruption of the vagus fibers had previously been used, the operation was done below the diaphragm, and it was very difficult to determine the percentage of the nerve fibers which had been sectioned; this procedure was finally abandoned. With the development of thoracic surgery, the transthoracic approach has become quite feasible; the vagus nerve branches about the esophagus can be divided with much greater assurance that most of the fibers have been severed, and a long segment can be removed to prevent regeneration.

This operation affords immediate relief from pain, marked reduction in the gastric acidity, and a great decrease in the motility of the stomach musculature. There is some tendency toward gastric retention, however —particularly if cicatricial narrowing of the pylorus is present. In certain of our cases it has been necessary to do a pyloroplasty or a gastroenterostomy to relieve this obstruction. On the other hand, these patients, even though their stomach is slow in emptying, can eat a great variety of foods; their pain is relieved, they gain weight, all are enthusiastic in evaluating their improvement, and apparently their ulcers heal.

If the permanent results bear out this dramatic early improvement, it is not too much to expect that this operation will be carried out on an increasingly large number of patients with ulcer before complications have developed. At the present, however, it must be emphasized that this method of therapy is in the experimental stage and that the operation is performed only in cases where surgical treatment is indicated. It should not be used unless one is prepared to follow through with careful and prolonged studies to determine the final results and to make them available in evaluating the permanent place of this operation in surgery of the stomach.

### *Surgical Complications of Peptic Ulcer*

The greater part of our experience with peptic ulcers during the past fifteen years has been in treating the so-called surgical complications. These are:

1. Obstruction.
2. Perforation.
3. Intractable pain.
4. Recurrence or reactivation of an ulcer.
5. Hemorrhage.

#### *Obstruction*

Obstruction may be caused by edema, cicatricial stenosis, or a combination of the two conditions. When it is due to edema, any regimen which reduces the irritation and favors healing of the ulcer may lead to rapid relief of the obstruction. When there is a fibrous constriction of severe degree, oper-

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1. Dragstedt, L. R.: Vagotomy for Gastroduodenal Ulcer, Ann. Surg. 122:973-989 (Dec.) 1945.

ative interference is necessary.

The procedure most commonly used in the younger patient is a gastric resection, preferably with removal of the ulcer. At times, however, a duodenal ulcer may be left in if all the antral mucosa is removed. For gastric ulcers near the cardia, where resection is difficult and carries a relatively high mortality, it has recently been advocated that the gastric acidity be reduced by resecting 50 to 65 per cent of the lower portion of the stomach, without disturbing the ulcer. It is claimed that, following such a procedure, the ulcer heals.

In older individuals with a chronic obstruction and low gastric acidity, gastroenterostomy has a definite place and will give good results in a high percentage of cases. The pyloroplastic operations have largely been abandoned, but in certain patients—particularly where there is retention from duodenal obstruction following a vagotomy, a pyloroplasty seems to be the operation of choice.

Following a resection the stomach may occasionally be anastomosed to the duodenum. In one of our cases, after a total gastrectomy, the duodenum was anastomosed to the esophagus. As a general rule, however, it is best to bring the jejunum up anterior to the transverse colon and attach it to the end of the stomach. Care must be taken to avoid constricting the intestine proximally or distally where it is attached to the stomach; the operator should guard against tension from too short a loop and against kinking and angulations. If these precautions are taken, the obstructions following resection can usually be avoided.

*Perforation*

Perforation into the free peritoneal cavity is always an acute abdominal emergency requiring immediate surgery. The treatment of choice in the presence of peritoneal soiling seems to be immediate closure with minimal surgery. Care should be taken to see that the ulcer is well closed, bringing peritoneum to peritoneum without undue tension. The outer layer of sutures may have to be placed in the tissues some distance from the ulcer in order to avoid the indurated friable tissue about the ulcer, which may not invert and in which the sutures will not hold.

*Intractable pain*

Intractable pain is not infrequently due to a perforating or perforated ulcer which does not enter the free peritoneal cavity, but is on the posterior wall of the stomach or duodenum and enters the pancreas. When such an ulcer does not respond to medical treatment, resection of 50 to 65 per cent of the stomach, with or without removal of the ulcer but with removal of all the antral mucosa, is indicated.

*Recurrence or reactivation of an ulcer*

Recurrent or reactivated ulcers, including marginal ulcers, may need to be treated by a suitable resection of the stomach; if a previous anastomosis has been performed, such a resection should include it. At the present time, however, we favor a vagotomy for recurrent or reactivated ulcers; the performance of further surgery on the stomach would then depend on the presence or absence of symptoms of obstruction.

Where there is a marginal ulcer with a gastro-jejuno-colic fistula, it is necessary to take down the anastomosis, close the opening in the colon, and make a new opening between the stomach and the intestine after additional resection. In cases where a gastro-enterostomy had been performed for a duodenal ulcer which has since healed, the channel through the duodenum may be restored. Under any of these conditions it seems to me that a vagotomy might be worth trying, as a supplementary procedure to make further ulceration less likely.

*Hemorrhage*

The treatment of patients with perforation, obstruction, and intractable pain has been largely standardized, and there is little argument about the procedure indicated. On the other hand, there is still much discussion as to the treatment indicated in the presence of an acute massive hemorrhage. In a patient who has had repeated attacks of hemorrhage, I would advise an interim vagotomy and careful observation as part of the experimental approach toward a solution of this difficult problem.

A review of the literature shows that about 20 to 25 per cent of all patients with peptic ulcers develop the complication of hemorrhage from the ulcer site. The mortality reported in groups of patients with this complication treated by nonoperative means varies from 1 per cent (Meulengracht) to 58 per cent (Ross), with other authors reporting mortality rates as follows:

Allen[2] 14.5 per cent; Bohrer[3] 17.5 per cent, Goldman[4] 17 per cent, and Gordon-Taylor[5] 8.1 per cent. It is evident that the mortality from the medical regimen can be reduced by referring for surgery those patients who do not respond favorably to treatment by non-operative means. This policy has been followed at Duke Hospital, where the mortality between 1940 and 1943 was 1.5 per cent in patients on the medical regimen and only 9 per cent in patients referred for surgery after medical treatment had failed. The mortality in the group considered as a whole was 2.6 per cent.

*The effect of age on mortality.* It is generally believed that patients over 50, especially if they have arteriosclerosis, do not withstand hemorrhage under a non-operative regimen nearly so well as do younger ones. Allen[2] reports that 18 of the 20 deaths in a group of 138 patients with acute massive hemorrhage occurred in individuals over 49 years old. Blackford and Williams[6] report a mortality rate of 30 per cent in patients over 50 suffering from duodenal hemorrhage.

Schenken, Burns, and Maes[7] report that autopsy records on 19 patients dying from duodenal hemorrhage showed that 58 per cent had arteriosclerosis and hypertension.

*Medical management.* There has been a gradual swing from the old, time-honored, and almost universally accepted "conservative starvation" medical management, with a mortality ranging from 4.2 per cent to 58 per cent, to a regimen consisting of a balanced bland diet supplemented by small doses of morphine, iron compounds, small transfusions, and an antacid-antispasmodic mixture. In 1906 Lenhartz reported a series of 146 patients treated by dietary measures, with a 2.14 per cent mortality. In 1927 Andresen reported a method of treatment using liberal feedings of a gelatin-water mixture, but did not give any statistical data. Meulengracht in 1934 reported a 1.2 per cent mortality in 251 patients treated by a balanced selected diet supplemented with medicines and transfusions. It was his report which had the greatest influence in popularizing this balanced dietary method of treatment. Numerous articles on the subject have since appeared, reporting mortality rates ranging from 0 to 11.2 per cent.

The rationale of the Meulengracht regimen is that the gastric secretions are "fixed" by the food, thus preventing digestion of the clot at the ulcer site; hunger contractions are diminished, and the tone of the stomach musculature is increased. At the same time a high-protein diet replaces the protein lost by hemorrhage. The ingestion of protein and carbohydrate protects the liver and prevents acidosis, and the mental attitude of the patient is greatly improved.

*Surgical management.* During this same period, the trend among surgeons has been toward earlier and more radical operative treatment. Finsterer[8] in 1919 first advocated early surgical intervention in patients with severe hemorrhage from ulcer. He reported 78 cases in which operation was performed within the first forty-eight hours, with a mortality of 5.1 per cent; in 74 patients operated on after forty-eight hours the mortality rate was 29.7 per cent. Gordon-Taylor[5] reported an operative mortality of 19 per cent among 32 patients operated on between 1919 and 1931.

Allen and Benedict[9] reported 138 cases of acute massive duodenal hemorrhage, with 12 deaths under the non-operative treatment. Eight were operated on after every other method of treatment had failed, and all died.

More recently many series of cases treated by operation have been reported, with an average mortality of 18 per cent. Bohrer[3] has made the largest single report by collecting data from surgeons all over the United States. In 1008 cases treated medically the mortality was 11.3 per cent and in 112 cases treated surgically the death rate was 17 per cent. Walters and Cleveland[10] report 135 cases of partial gastrectomy for bleeding ulcer, with a mortality of 10 per cent; they do not differentiate between chronic and acute hemorrhage, however.

Graham believes that a patient over 50

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2. Allen, A. W.: Acute Massive Hemorrhage from Upper Gastrointestinal Tract, with Special Reference to Peptic Ulcer, Surgery 2:713-731 (Nov.) 1937.
3. Bohrer, J. V.: Massive Gastric Hemorrhage, with Special Reference to Peptic Ulcer, Ann. Surg. 114:510-525 (Oct.) 1941.
4. Goldman, L.: The Problem of Bleeding Peptic Ulcer, Am. J. Surg. 40:545-551 (June) 1938.
5. Gordon-Taylor, G.: The Attitude of Surgery to Haematemesis, Lancet 2:811-815 (Oct. 12) 1935.
6. Blackford, J. M. and Williams, R. H.: Fatal Hemorrhage from Peptic Ulcer, J.A.M.A. 115:1774-1776 (Nov. 23) 1940.
7. Schenken, J. R., Burns, E. L., Maes, U.: The Role of Hypertension and Pancreatic Erosion in Massive Fatal Hemorrhage from Gastric and Duodenal Ulcers, Surg., Gynec. & Obst. 74:1058-1060 (June) 1942.
8. Finsterer, H.: Surgical Treatment of Acute Profuse Gastric Hemorrhage, Surg., Gynec. & Obst. 69:291-298 (Sept.) 1939.
9. Allen, A. W., and Benedict, E. B.: Acute Massive Hemorrhage from Duodenal Ulcer, Ann. Surg. 98:736-749 (Oct.) 1938.
10. Walters, W. and Cleveland, W. H.: Results of Partial Gastrectomy for Bleeding Duodenal, Gastric, and Gastrojejunal Ulcer, Ann. Surg. 114:481-497 (Oct.) 1941.

**Table 1**

**Incidence of Hemorrhage in Patients with Peptic Ulcer Admitted to Duke Hospital between 1930 and 1943**

| | *Number* | *Percent.* |
|---|---|---|
| Total patients | 1340 | 100 |
| With hemorrhage | 186 | 14 |
| With severe hemorrhage (Hgb. 50% or lower) | 77 | 5.75 (41.4% of 186) |

years of age with a hemoglobin as low as 50 should be considered for surgery. Loher, Balfour, and Bevin reserve surgery for those patients in whom medical treatment has failed, or who have complications which are definite indications for surgery.

Of the many surgical procedures which have been employed for this condition, the operation of choice is a partial gastrectomy with removal of the ulcer. Operation should be preceded, accompanied, and followed by the transfusion of large quantities of blood.

With or without surgical intervention, the present trend is toward earlier and more extensive use of blood transfusions. There seems to be less fear now that a transfusion will raise the blood pressure sufficiently to cause a recurrence of the hemorrhage.

### *The Treatment of Patients with Peptic Ulcer Complicated by Massive Hemorrhage at Duke Hospital*

Recently we have examined the records of all the patients treated for peptic ulcer in the Duke Hospital between the years 1930 and 1943 (table 1). These statistics do not include any of the ambulatory patients not admitted to the hospital. Out of a total of 1340 patients with peptic ulcers admitted during this thirteen-year period, 186 (14 per cent) had the complication of hemorrhage, either mild or severe. Seventy-seven, or 41.4 per cent of the patients with bleeding, had a hemoglobin of 50 per cent or lower and were classed as cases of severe hemorrhage. Sixty-seven of the patients were males and 10 were females. There were 55 white and 22 colored patients. The age distribution is shown in table 2.

*Immediate results*

**Table 2**

**Age of Patients with Peptic Ulcer Complicated by Severe Hemorrhage**

| *Age* | *No. Patients* | *Medically Treated* | *Surgically Treated* |
|---|---|---|---|
| Over 45 | 33 | 33 | 5 |
| Under 45 | 44 | 44 | 6 |

All of these 77 patients with severe hemorrhage were treated medically on a dietary regimen supplemented by medicines and blood transfusions. Twelve of these did not respond satisfactorily. One, a colored patient aged 23 who had been bleeding for three days, entered the hospital with a hemoglobin of 17 per cent and a carbon dioxide combining power of 17 volumes per cent; he died without being referred to surgery. The other 11 patients who continued to bleed were referred to surgery within five to twenty-one days after the onset of the hemorrhage, and after it seemed evident that they would not stop bleeding without surgical intervention. These 12 patients were the immediate failures in the medical regimen (table 3).

**Table 3**

**Immediate Deaths and Failures with the Medical and Surgical Treatment of Peptic Ulcer with Severe Hemorrhage**

| | *No. Patients* | *Deaths* | | *Other Immediate Failures* | |
|---|---|---|---|---|---|
| | | *No.* | *Percent.* | *No.* | *Percent.* |
| Medical regimen | 77 | 1 | 1.3 | 11 | 14.29 |
| Surgical treatment (after failure of medical regimen) | 11 | 1 | 9.0 | 0 | 0 |
| Combined medical and surgical groups | 77 | 2 | 2.6 | 0 | 0 |

Of the 11 patients who failed to respond to a medical regimen and who were treated surgically, 10 survived and 1 died, giving a mortality of 9 per cent. At least 8 of these 11 patients gave a history of preceding episodes of bleeding (table 4). The patient who died had a bleeding ulcer near the ampulla of Vater, so that it could not be removed without prohibitively extensive surgery. At the time of operation the bleeding had stopped, and it was the judgment of the operator that an exclusion type of operation would avoid reactivation of the hemorrhage. Following the operation, however, death resulted from the loss of blood. Autopsy revealed that the hemorrhage came from an open artery in the bed of the ulcer.

The two most important factors in the surgical treatment of these patients seem to us to be the administration of large quantities of blood, and the performance of operation as expeditiously as possible. The amount of blood given immediately before, during, and following operation in these patients varied from 1500 to 7500 cc. (table 4).

**Table 4**

**Results of Operations for Bleeding Peptic Ulcer with Severe Hemorrhage**

| *Case* | *Race* | *Sex* | *Age* | *Hgb. (Percent.)* | *Duration of Hemorrhage* | *Previous Hemorrhages* | *Blood Given* | *Type of Operation* | *Result of Operation* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | W | M | 21 | 39 | 11 days | 3 | 2500 | RES | Improved |
| 2 | C | F | 48 | 50 | 5 days | 1 | 1500 | PGE | Improved |
| 3 | W | M | 41 | 50 | 14 days | 1 | 2000 | RES | Improved |
| 4 | W | M | 59 | 48 | 10 days | 2 | 2000 | PGE | Improved |
| 5 | W | F | 37 | 48 | 8 days | 0 | 5000 | RES | Died |
| 6 | C | M | 37 | 37 | 15 days | 2 | 5000 | RES | Improved |
| 7 | C | M | 34 | 38 | ? | ? | 2500 | PGE | Improved |
| 8 | C | M | 41 | 35 | 21 days | 1 | 7500 | RES | Improved |
| 9 | W | M | 57 | 41 | 7 days | 0 | 2500 | RES | Improved |
| 10 | W | M | 41 | 30 | ? | 1 | 3500 | PGE | Improved |
| 11 | W | M | 19 | 50 | 8 days | 1 | 2000 | RES | Improved |

W —White
C —Colored
M —Male
F —Female
RES—Subtotal gastric resection
PGE—Posterior gastro-enterostomy

In 4 of these patients only a posterior gastro-enterostomy was performed. These patients were among the earlier cases, but the results were satisfactory. In one of these patients a carcinoma of the stomach was suspected, but when exploration was done five weeks later the ulcer had healed. A fifth patient in this series had a posterior gastro-enterostomy, but continued to bleed and became delirious; resection was performed with the patient in this condition, and he recovered.

### *Follow-up study*

Sixteen of the 77 patients died of causes not related to the ulcer and 10 could not be followed, leaving a group of 49 who were followed for three to sixteen years. Forty of these had been treated exclusively by medical means, and 9 surgically after medical treatment failed. Table 5 shows that of the medically treated patients 3 (7.5 per cent) died of subsequent episodes of hemorrhage, 6 others (15 per cent) have had further episodes of hemorrhage, and 13 (32.5 per cent) still have pain referable to the ulcer. Only 45 per cent are asymptomatic. Thirteen of the 19 medically treated patients who are still having symptoms, and 7 of the 18 asymptomatic patients are still on a diet. In contrast to this group, only 1 of the 9 surgically treated patients followed has a complaint associated with the ulcer, and this is only mild epigastric discomfort.

**Table 5**

**Follow-Up (3-16 years) of 49 Patients with Peptic Ulcer Complicated by Severe Hemorrhage**

| | *Treated Medically* | | *Treated Surgically* | | *Total* | |
|---|---|---|---|---|---|---|
| | *No.* | *Percent.* | *No.* | *Percent.* | *No.* | *Percent.* |
| Asymptomatic | 18 | 45 | 8 | 89 | 26 | 53 |
| Still having pain | 13 | 32.5 | 1 | 11 | 14 | 28.5 |
| Has had recurrence of hemorrhage | 6 | 15 | 0 | 0 | 6 | 12.3 |
| Dead of disease (recurrent hem.) | 3 | 7.5 | 0 | 0 | 3 | 6.2 |
| Total | 40 | 100 | 9 | 100 | 49 | 100 |

The total of the immediate and subsequent mortality rates referable to peptic ulcer is exactly the same in the medically and surgically treated groups (table 6).

**Table 6**

**Mortality from Peptic Ulcer with Severe Hemorrhage**

| | *Immediate* | *Subsequent from Ulcer* | *Total* |
|---|---|---|---|
| Treated medically | 1.5% | 7.5% | 9.0% |
| Treated surgically | 9.0% | 0 | 9.0% |

## *Summary and Conclusions*

Of 77 patients admitted to Duke Hospital with massive hemorrhage from a peptic ulcer during the period from 1930 to 1943, all were treated by a medical regimen. One of these died, 11 continued to bleed and were subjected to surgery, and the remaining 55 apparently responded satisfactorily to medical treatment. One of the 11 patients requiring emergency surgery died as a result of continued bleeding from an ulcer that could not be resected. Nine of the 10 patients who survived operation have been followed for three to sixteen years, and only 1 is having mild symptoms of an ulcer.

The success of the surgical treatment would seem to be dependent on the expeditious performance of the operation, preferably with resection of the ulcer, and on the administration of large quantities of blood before, during, and after operation.

Of the 40 patients treated medically who have been followed, 22.5 per cent have had subsequent hemorrhages, one third of these ending fatally. The fact that 51 per cent of the survivors are still having symptoms, and that 54 per cent are still on a diet suggests the possible desirability of surgery in more of these patients after the acute condition has subsided. Undoubtedly the operative mortality would not be above that resulting from subsequent hemorrhages, and many more of the survivors would be free of symptoms.

From this study we can conclude that, during the phase of active hemorrhage, an initial period of medical treatment is indicated in all patients with bleeding peptic ulcer, regardless of age. If active bleeding continues under this regimen, surgical interference is indicated, and has been successful in 90 per cent of our cases. Because bleeding and ulcer symptoms recur in a large percentage of patients whose bleeding stops under a medical regimen, surgery is considered advisable in most cases after the acute condition subsides. With our present knowledge, vagotomy, if it is performed as an experimental project with the patient's consent, may be the operation of choice in patients recovering from their hemorrhage under a medical regimen of treatment.

### *Discussion*

**Dr. John Elliott:** Dr. Hart has called attention to the importance of massive transfusions in the treatment of hemorrhage from peptic ulcers. In this day when donors are scarce and blood is so precious, we should review the indications for transfusion and give only that quantity and fraction of blood required to restore the normal physiology.

In patients with bleeding ulcers it is often necessary to give whole blood because there is a reduction in blood plasma as well as in red cells. When the red cell count is down to 1,000,000, however, from chronic hemorrhage, it is frequently impossible to give enough whole blood to restore the red cell count to normal in a single transfusion. The red cell count can be restored to normal, however, by transfusing the cells alone. In one case I recall the red cell count was 1,000,000 after a hemorrhage of several days, but the blood plasma was only slightly reduced; the patient's systolic blood pressure was 100. We gave the red cells from 4800 cc. of blood to the patient in a single transfusion, thus restoring the red cell count to normal within six hours. The plasma from the 4800 cc. of blood was still available for other cases in which it was desperately needed.

When transfusion is indicated, the decision should be made as to whether plasma, red cells, or whole blood should be given. When the indication is for red cells alone, the blood plasma being normal, only the red cells should be given; when the indication is for plasma, only the plasma should be given. In patients with gastric hemorrhages, when the blood volume and the red cells are both reduced, whole blood should be given until the volume is restored; the transfusion should then be continued with red cells.

## NEUROPSYCHIATRIC ASPECTS OF MENTAL DEFICIENCY

### *A Clinicopathologic Study Based on Two Hundred Autopsies*

Clemens E. Benda, M.D.*
Wrentham, Massachusetts

When in 1887 J. Langdon Down(1), to whom we owe the first distinct description of mongolism, was invited by the Medical Society of London to give a series of lectures on "Mental Affections of Childhood and Youth," he introduced himself with the following words:

> "When you, sir, and your colleagues on the Council of the Medical Society of London, did me the honour to request me to deliver the Lettsomian Lectures on Medicine for this year, I bethought myself that mental deviations in childhood and youth had never been the subject of a disquisition from this chair."

I think that now, sixty years later, this is almost the first time that a neuropsychiatric society has invited a speaker to give the main address on mental deficiency, and I want to express my gratitude and appreciation to the president and members of this society who thought it worth while to have a special paper on this branch of neuropsychiatry. As a matter of fact, mental deficiency is a legitimate child of neuropsychiatry, although it is still treated rather as a stepchild. When Langdon Down called his lectures "Mental Affections of Childhood and Youth," he emphasized clearly the relationship between psychiatry and the study of what we now usually call mental deficiency.

### *The Importance of the Mental Affections of Childhood*

It is unfortunate that neuropsychiatrists have until recently somewhat neglected the field of child study, and left it almost entirely to the psychologists. Many afflictions of adolescence and adult life make their first appearance many years earlier, and the manifestations of mental disease in children are frequently much clearer than those of the same type which appear in adults. Moreover, some conditions which are later con-

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1. Down, J. L.: On Some of the Mental Affections of Childhood and Youth, London, J. & A. Churchill, 1887.

sidered "degenerative" diseases are apparently the end results of acute disorders of infancy and childhood. I personally have come to consider the term "degenerative disease" a misnomer; I am convinced that most such diseases are either metabolic disorders or post-infectious conditions which have progressed to the stage of reparative sclerosis or degeneration. Wilson's disease, formerly believed to be a "degenerative" disease, has been found to be a metabolic disorder of the liver, and we may soon trace the etiology of liver cirrhosis to an original infectious hepatitis or erythroblastic anemia. Other so-called degenerative diseases such as the Hallervorden-Spatz syndrome, paralysis agitans, and so forth, also seem to have an infectious or metabolic basis. On the other hand, a better understanding of metabolic disorders will lead to a recognition of the fact that many mental conditions are not expressions of a genetic mental inadequacy, but manifestations of an abnormal metabolism of fats or proteins like that seen in amaurotic idiocy or phenylpyruvic oligophrenia.

In this way the study of mental affections of childhood and youth offers the most promising field for an enlargement of physiologic psychiatry. I do not want, however, to say that all of psychiatry should end in a study of physiology. On the contrary, I think that the neuroses appear even more clearly conditioned by psychologic factors.

### *Developmental Pathology*

Since I am using the results of a pathologic study as the chief basis for classification of the various types of mental deficiency, I would like to add a few words about the special type of pathology which I have introduced at the Wrentham State School. The general pathologist is interested in the cause of death. His diagnosis of meningitis, tumor, tuberculosis, hepatitis, pneumonia, or coronary thrombosis explains the death, but does not necessarily contribute to an understanding of the manifestations of mental deficiency. If we want to know the cause of mental deficiency, we have to go back to those factors which were responsible for the abnormal development of the nervous system, and have to eliminate all those confusing conditions which have entered the picture later in life and which are likely to obscure the original factors. I have applied the name "developmental pathology" to this field of research, and have attempted in several articles to emphasize the difference between developmental and general pathology.

In contrast to the aims of general pathology and neuropathology, developmental pathology attempts to study the deviations from the norm which occurred during that important plastic period before development was completed. A main goal of developmental pathology is, therefore, the determination of the time at which deviations from the normal course took place. In general, we can divide developmental anomalies into those of the prenatal, the natal, and the postnatal periods. Anomalies developing during the prenatal period are usually referred to as "developmental," while the natal anomalies are usually traumatic, and the postnatal are traumatic, infectious, or metabolic. The determination of the time of onset of pathologic lesions is of great eugenic and medical interest, but it should be stated that the developmental disorders of the prenatal period are by no means generally or necessarily of a hereditary nature.

### *Pathologic Study of 200 Cases of Mental Deficiency*

The customary pathologic diagnoses made at autopsy on 200 patients with mental deficiency are listed in table 1. Since the study was based on cases seen at autopsy, the different types of mental deficiency are not represented in their true proportions. The familial or endogenous type is much more frequent than idiocy or mongolism, but since the former group of patients live much

**Table 1**

**Pathologic Diagnoses**

| *Diagnosis* | *No. Cases* |
|---|---|
| Mongoloid deficiency | 50 |
| Microcephaly | 19 |
| Hydrocephaly | 13 |
| Vascular accidents (traumatic) | 30 |
| Post-infectious conditions | 17 |
| Congenital syphilis | 5 |
| Familial moronism and high-grade imbecility | 20 |
| Familial idiocy and low-grade imbecility | 15 |
| Phenylpyruvic oligophrenia | 2 |
| Endocrine disorders (cretinism, goiter, polyglandular disturbances) | 4 |
| Dystrophia myotonica | 3 |
| Dwarfism | 3 |
| Neoplastic malformations (tuberous sclerosis, neurofibromatosis) | 4 |
| Metabolic disorders (Wilson, Hallervorden) | 2 |
| Kernicterus (Rh-factor) | 2 |
| Questionable cases | 11 |
| Total | 200 |

longer than patients with exogenous mental deficiency, they are far less well represented. For several reasons, which need not be discussed here⁽²⁾, mongolism was the condition most frequently encountered in this study; 50 cases were seen at autopsy. There were 20 morons and high-grade imbeciles with an I.Q. of 45 or above (who really should be classified as morons), and 15 undifferentiated idiots and low-grade imbeciles. Most other types of mental deficiency were plentifully represented.

It is quite obvious that such a table of pathologic diagnoses does not give essential data in many cases as to the etiologic factors. There are, for instance, several causes for microcephaly. Some cases are of developmental prenatal etiology, some of traumatic origin. Hydrocephaly, likewise, may be caused by malformations, infectious diseases or tumors. The undifferentiated types of idiocy and imbecility ought finally to be classified according to the pathologic diagnosis, and eventually an entirely different system of classification will evolve. This system will be readily demonstrated by discussing some of the major groups.

### *Microcephaly*

The diagnosis of microcephaly was made in 19 cases, which are listed in table 2. As may be seen, the circumference of the head was less than 19 inches in all cases except case 6, in which the circumference was 21 inches. In this patient the final circumference was apparently increased as a result of hydrocephalus, but the original condition was microcephaly. In another case (case 7) an increase from 16¾ inches to 18.1 inches was observed in the last period before death, and was also due to an increase in spinal fluid.

The diagnosis of microcephaly was made when the circumference of the head was less than 19 inches in persons above 10 years of age, and about 2 inches below average in infants and children below 10. Micrencephaly was conspicuous in all patients except cases 7 and 10, whose brains weighed slightly more than 1000 Gm. In all the other cases, the brain was strikingly undersized, ranging from 132 Gm. in a child of 4½ years up to 987 Gm. in a child of 15 years. The patient whose brain weighed 1078 Gm. at autopsy was found to have hydrencephaly, and the weight included a considerable amount of spinal fluid within the ventricular

Table 2
MICROCEPHALY

| *No.* | *Case No.* | *Sex* | *Age* | *Body Length* | *Head Circumference* | *Brain Weight* | *Pathologic Diagnosis* |
|---|---|---|---|---|---|---|---|
| 1 | 46/189 | M | 32 | 4′7″ | 17½″ | 720 Gm. | Cystic degeneration. Subcortical encephalomalacia. |
| 2 | 46/183 | M | 7 9/12 | 3′2½″ | 14¾″ | 360 Gm. | Prenatal; developmental. |
| 3 | 45/170 | M | 10 2/12 | 3′5″ | 15″ | 420 Gm. | Prenatal; developmental. |
| 4 | 44/149 | M | 7 6/12 | | 16⅜″ | 508 Gm. | Cystic degeneration. Microgyria. |
| 5 | 43/109 | F | 7 11/12 | 4′1″ | 18″ | 690 Gm. | Hemiatrophy. Cystic degeneration. |
| 6 | 43/106 | M | 22 | 5′4″ | 21″ | 700 Gm. | Hemiatrophy. Cystic degeneration. |
| 7 | 42/79 | F | 5 6/12 | | 18 1/10″ | 1078 Gm. | Cerebellar cleft. |
| 8 | 41/76 | M | 4 1/12 | 2′6″ | 17¼″ | 132 Gm. | Cystic degeneration. |
| 9 | 41/75 | M | 17 11/12 | 5′4″ | 17¾″ | 788 Gm. | Cystic degeneration. |
| 10 | 39/40 | F | 5 6/12 | 3′3″ | 17¾″ | 1009 Gm. | Small brain. Vascular sclerosis. |
| 11 | 39/45 | M | 10 6/12 | 3′6½″ | 18½″ | | Developmental; microgyria. |
| 12 | 37/3 | F | 3 5/12 | 3′ | 18″ | 565 Gm. | Cystic degeneration. |
| 13 | 38/18 | F | 2 3/12 | 2′2″ | 14½″ | 250 Gm. | Cystic degeneration. |
| 14 | 44/132 | F | 20 | | 18″ | 610 Gm. | Cerebral dwarfism. Chronic infection. |
| 15 | 42/97 | M | 1 | 2′1″ | 12″ | 138 Gm. | Hemorrhage. |
| 16 | 42/98 | F | 13 | 3′1″ | 17¾″ | 498 Gm. | Cystic degeneration. |
| 17 | 41/74 | F | 15 4/12 | 4′3″ | 19″ | 987 Gm. | Developmental. |
| 18 | 41/67 | M | Newborn | 16″ | anencephalic | | Absent or destroyed brain tissue. |
| 19 | Mansfield Depot* | M | 17 | 3′11″ | 16″ | 635 Gm. | Congenital neoplastic malformation; cleft in posterior skull. |

* Courtesy of Dr. Neil Dayton, Superintendent

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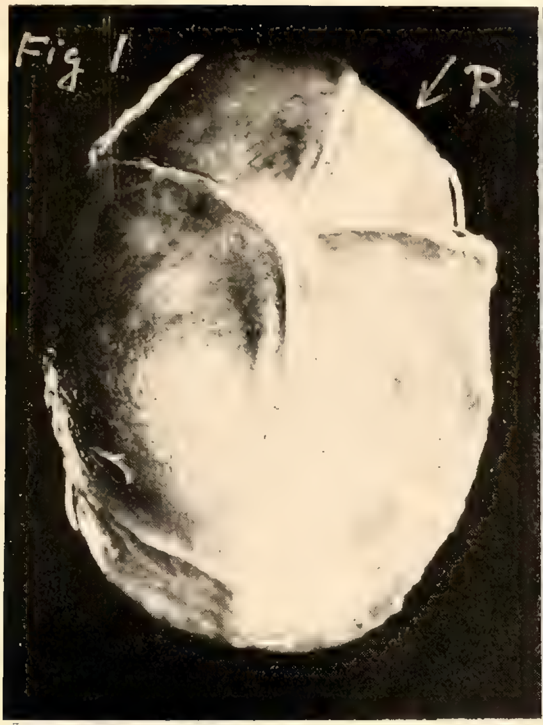
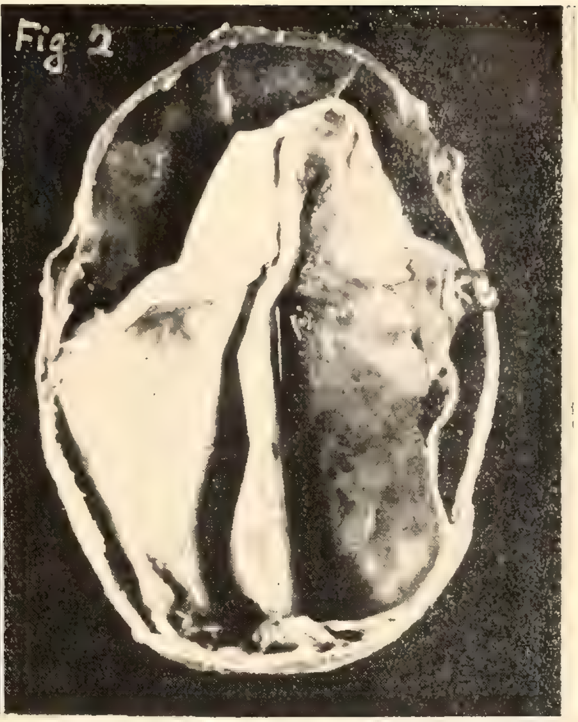
2. Benda, C. E.: Mongolism and Cretinism, New York, Grune & Stratton, 1946.





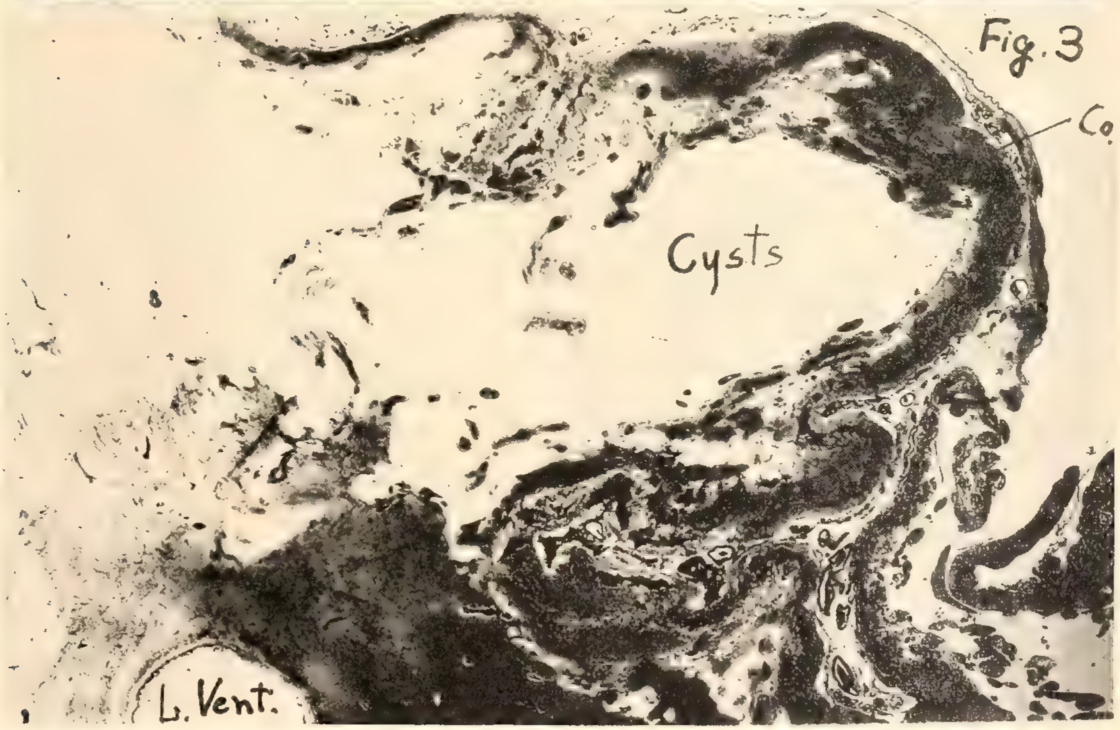


Fig. 1. Superior view of the calvarium of a microcephalic infant 4 months of age. Note the depressed right frontal bone and overlapping of the left parietal bone over the right parietal bone and the left and right frontal bones. The anterior fontanel is completely obliterated.

Fig. 2. Inferior surface of the calvarium and dura. Note the large epidural and subdural hemotamas. The left dura shows evidence of organization with duplication of the dura sheath.

Fig. 3. Coronal section through the brain (myelin stain). Note the subcortical encephalomalacia with cystic degeneration of the white matter; also the glia and fibrous organization of the gray matter of the cortex. L.V.—Lateral ventricle; Co.—Cortex.

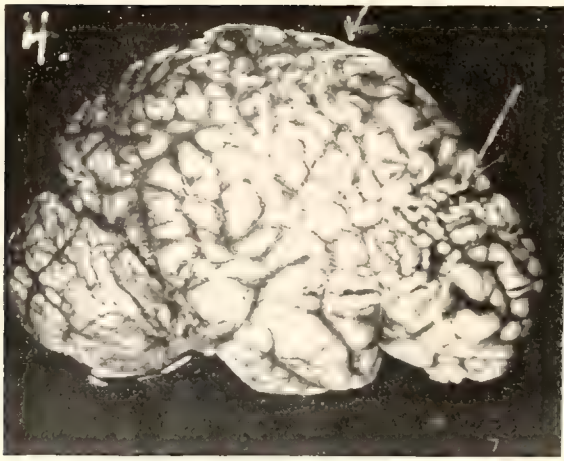


Fig. 4. Lateral view of the brain of a microcephalic patient (Case 1, Table 2). Note the sclero-gyria of several frontal and precentral convolutions.

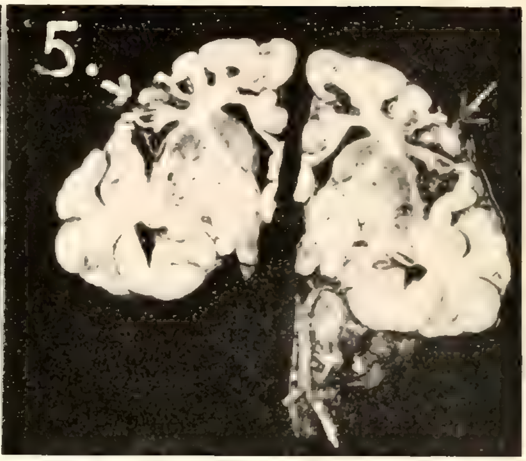


Fig. 5. Coronal section through the brain seen in fig. 4. Note the bilateral subcortical encephalomalacia in a distribution following the branches of the medial cerebral artery.

system. There was also an accumulation of spinal fluid and a great amount of vascular sclerosis in the brain which weighed 1009 Gm.; when it was weighed a second time the weight was only 956 Gm.

Two conditions are conspicuous as causes of microcephaly: prenatal developmental anomalies and cystic degeneration of the brain. Nine patients, or almost 50 per cent of the cases of microcephaly studied at autopsy, showed cystic degeneration of the brain. Cystic degeneration causes the white matter to become vacuolated and gradually replaced by cavities which are filled with fluid. The gray matter is more resistant in the beginning, but eventually yields to the progressive degeneration; the cortical mantle is finally completely destroyed, with some residues floating in the spinal fluid. The cases listed in table 2 showed all stages of cystic degeneration, from the formation of a few small cavities to an almost complete destruction of the brain (case 8). I have dealt with the subject of cystic degeneration in a previous paper, and I shall return to it in discussing the traumatic group.

The other cases of microcephaly are those in which the brain development failed to complete the normal patterns(3). Case 3, that of a 10-year-old microcephalic child, is an example of this type of malformation, in which the central nervous system resembles strikingly that of a lower animal. In 1 patient, an anencephalic monster who died at birth, the brain was completely destroyed and only a bloody mass was left. Another patient had a striking cleft formation in the cerebellar region, in addition to early developmental arrest.

Another case which deserves special interest was that of a 1-year-old child from a healthy family. The father, an outstanding man in public life, was extremely depressed about the child's condition, thinking, as most people do, that congenital microcephaly is a result of genetic factors. He was greatly relieved when he learned from the autopsy that the child had had a large hemispheric hemorrhage apparently in the last months before delivery, possibly due to placental hemorrhage or high blood pressure in the mother. This case was clearly the result of an accident, and no hereditary factors were involved.

Two patients showed small brains about half the size of a normal brain. Whether these cases represent true cerebral dwarfism or are due to unknown factors I am not yet able to decide. Histologic study of the brains showed the great increase in vascularity and the sclerosis which is so frequently found in postencephalitic conditions. These cases may have been due to fetal encephalitis, but the evidence is not yet conclusive.

The term "microcephaly" is descriptive to some extent, but it does not cover a morbid entity. While there are a few instances of familial microcephaly, it is obvious that microcephaly of the prenatal developmental type by no means indicates in every case a hereditary genetic inferiority. Cases due to

3. (a) Benda, C. E.: Microcephaly, Am. J. Psychiat. 97:1135-1146 (March) 1941.
(b) Yakovlev, P. I., and Wadsworth, R. C.: Schizencephalies, J. Neuropath. & Exper. Neurol. 5:169-206 (July) 1946.

x-ray radiation have been collected by Murphy and others. As a rule the factors producing microcephaly are of a vascular, infectious, or unknown extrinsic nature. Clinical differentiation of the various types may be difficult, but seems to be possible in the majority of cases.

Malformations of the central nervous system are frequently associated with other anomalies. One of our patients with a cerebellar cleft had a cleft palate and a latent spina bifida, and two patients with the most conspicuous cases of microcephaly showed abnormalities of the sex organs (pseudohermaphroditism), webbed toes or fingers, and other stigmata of early developmental pathology.

### *Hydrocephaly*

Cases of hydrocephaly may also be divided into those with congenital malformations and those which develop after birth as a result of various factors, mainly inflammatory processes, gliosis and tumors. The 11 cases of hydrocephaly in this series are listed in table 3. Seven of these cases represent congenital malformations, among which cerebellar clefts and meningomyelocele play a paramount role.

The recent surgical literature may give one the impression that a large percentage of cases of hydrocephaly can be ameliorated by surgical procedures, mainly cauterization of the choroid plexus. It has also been pointed out that the skillful removal of a meningocele may prevent the development of hydrocephaly. In many cases, however, profound malformations involving the whole length of the spinal cord and the brain axis are present. In some of our cases the spinal cords showed duplication and syringomyelic changes on several levels, while the cerebellum showed cleft formations or absence of the vermis.

Some of our cases are identical with those described by Arnold and Chiari, and are classified as the "Arnold-Chiari malformation." Some of these malformations are of a genetic nature; in one family the only two children suffered from an Arnold-Chiari deformity. Spina bifida or related malformations are frequently found in other members of such a family.

Among the 4 patients with hydrocephaly which was not congenital in origin was one with neurofibromatosis which developed early in infancy and led to occlusion of the aqueduct. In another case a neuroepithelioma occluded the third ventricle, and in the 2 remaining cases a gliosis of possible inflammatory nature led to ependymitis and gliosis of the aqueduct, with almost complete occlusion.

The choriod plexus was studied in all these cases of hydrocephalus, and in no case was hypertrophy found; on the contrary, degeneration of the choroid plexus was striking in most instances. Marked ependymitis was noted in every case, however, and changes in the ependymal lining of the ventricles and aqueduct were persistent findings. It is my conviction that the mechanism of internal hydrocephaly is related to the ependymal lining of the ventricles and depends upon

**Table 3**
**HYDROCEPHALUS**

| *No.* | *Case No.* | *Sex* | *Age* | *Head Circumference* | *Pathologic Diagnosis* |
|---|---|---|---|---|---|
| 1 | 37/12 | F | 7 mos. | 24 in. | Cerebellar cleft. |
| 2 | 41/73 | M | 3 5/12 | 35 1/10 in. | Myelomeningocele.<br>Cerebellar porencephaly. |
| 3 | 42/77 | F | 1 2/12 | 27 in. | Cleft in clivus.<br>Myelomeningocele.<br>Arnold-Chiari malformation. |
| 4 | 42/80 | F | 3 8/12 | 26¼ in. | Cerebellar anomalies.<br>Cystic spinal cord. |
| 5 | 42/95 | F | 9 mos.<br>24 days | 27¾ in. | Agenesis. Porencephaly. |
| 6 | 43/114 | F | 5 10/12 | 18¼ in. | Cerebellar cleft. |
| 7 | 42/84 | F | 1 8/12 | 17½ in. | Cerebellar agenesis.<br>Rachischisis (genetic). |
| 8 | 42/86 | F | 29 | Not enlarged | Neuroepithelioma,<br>third ventricle. |
| 9 | 41/64 | F | 14 7/12 | 22½ in. | Agenesis of mantle.<br>Gliosis of aqueduct with obstruction. |
| 10 | 40/46 | F | 14 7/12 | 22½ in. | Neurofibromatosis. |
| 11 | 45/172 | F | 1 6/12 | 29¼ in. | Ependymitis, post-infectious. |

interference with the exchange between the spinal fluid and the brain tissue which has been postulated by many writers. Dr. Yakovlev(4) seems to have recently come to the conclusion that hydrocephaly is not primarily due to an increase in the pressure of spinal fluid, but to an abnormal structure of the brain wall which makes it unable to exercise sufficient resistance against even a normal spinal fluid pressure. The pressure therefore continues to increase because of failure of the ventricle wall to establish the proper equilibrium.

### *Vascular accidents and birth injuries*

Among the 200 autopsies, 38 cases were found in which the anomalies were due to vascular lesions. If we exclude the 50 cases of mongolism, the incidence of vascular pathology among the remaining 150 cases is 25.3 per cent; if we exclude the 35 cases of endogenous mental deficiency, however, the incidence of vascular pathology among the remaining cases is 33 per cent. One must remember that most of these patients were classified as idiots and low-grade imbeciles, and that only one was in the moron group. The significance of traumatic lesions in the etiology of the severe types of mental deficiency is, therefore, beyond argument.

In a previous paper(5) I pointed out that the vascular lesions fall into three main groups: (1) mantle sclerosis or subcortical encephalomalacia, (2) cystic degeneration in which the white matter is principally involved, and (3) diffuse patchy devastation with widespread lesions and diffuse involvement of the gray matter of the cortex and basal ganglia. Among the microcephalic patients 8 were found to have subcortical encephalomalacia or cystic degeneration. These cases provide evidence that trauma, with or without asphyxiation, is a main cause of cystic degeneration. Another case which has come to autopsy since this series was completed shows more clearly than most cases which have been presented before the relationship between skull compression, epidural and subdural hematoma, and the cystic degeneration of the brain which we have found in 6 other cases.

The infant (case 44/153) was one of twins, the twin sister being in good condition. Both parents were healthy and normal. Delivery was accomplished by low forceps after eighteen hours of labor. The baby weighed 4 14/16 pounds at birth, and was 18 inches long. On the third day after delivery twitching of the right upper and right lower extremities was observed; the baby was in a semicomatose condition. The twitching continued for several days, and the infant was unable to take feedings except when they were given by an eye dropper. On the tenth day after birth the head began to enlarge. On the fifteenth day twitching ceased, but spasticity of arms and legs was noted. Almost a month after birth there was a sudden rise of temperature up to 104, and the size of the head began to decrease. In the hospital the diagnosis of cerebral agenesis was made. The child appeared blind to light; the pupils did not react, and nystagmus was present on lateral deviation.

The child was admitted to our school on November 9, 1944, at the age of 3 months and 3 weeks. Physical examination showed a child measuring 21½ inches in length and weighing 5½ pounds. The most outstanding feature was depression of the right frontal bone and overlapping of the left skull bones over the right side; no fontanel was present. The legs were spastic and showed a tendency to crossing. There was paralysis of the left external eye muscle, with strabismus and nystagmus toward the left; the pupils were unequal.

The child died three weeks later, and an autopsy was made. When the scalp was reflected from the calvarium, the distortion of the skull bones was easily recognizable. The right frontal bone was pushed inward beneath the parietal bone, which was overlapping. The skull seemed compressed in the right diameter. When the calvarium was removed, a huge epidural and subdural hemorrhage was found on the left side, and an epidural hemorrhage on the right side. That this hemorrhage was about three months old could be shown by the organization of the dura, with duplication of the sheets. A large blood clot covered the convexity of the brain, which itself showed a severe degree of cystic degeneration.

The largest number of birth injuries result in the third type of pathology—diffuse patchy degeneration. Twenty-five cases of this type were observed, including 14 cases of spastic paralysis or Little's disease. Little's disease is frequently associated with a "status marmoratus" of the basal ganglia, which has also been described under the name of "Vogt's disease." In 7 cases such status marmoratus was found. The findings in these cases seem to indicate that the status marmoratus and, therefore, Little's disease is the result of a birth trauma and is not a congenital malformation. It is beyond the scope of this paper to argue the point in detail, but I may say that status marmoratus was associated with other pathology indicative of traumatism in so many instances that the relationship cannot be denied. Spatz has compared the status marmoratus with a "central amputation neurinoma," and my observations seem to support such an interpretation.

### *Post-infectious conditions*

It has been suspected for a long time that encephalitis plays an important part in the

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4. Yakovlev, P. I.: Personal communication.
5. Benda, C. E.: The Late Effects of Cerebral Birth Injuries, Medicine 24:71-110 (Feb.) 1945.

production of mental deficiency. Evidence for such a relationship is found not only in hospital case histories, but in observations of children who have had encephalitis and afterwards show changes in their character, behavior, and mentality. While Parkinsonism almost never develops before puberty, restless, overactive behavior in childhood may precede the development after puberty of a state of post-encephalitic Parkinsonism. One example may be cited:

A boy (case 39/35) who was born in Sweden in 1920 cried continuously when he was 7 months old, but doctors in Sweden told the mother that this was not serious. During this time the child was unusually restless and had convulsions and high temperatures. We may note that this illness occurred in 1921, when the incidence of encephalitis lethargica was highest in Europe.

The child developed slowly, but was noisy and exceedingly active. He proved to be vicious toward other children, and sometimes deliberately pushed them down. He was difficult to control, and it was impossible to get his attention for any length of time. Another note states that he kept running around in circles and scratching himself. He seemed to know more than he was able to express. Still another note states that his behavior suggested psychosis.

In 1937, when the boy was 17 years of age, a peculiar posture suggestive of post-encephalitic Parkinsonism developed, together with a marked coarse tremor and rigidity, especially of the right arm. He could not bend the right arm to touch his face. He died in 1939, and the study of the brain revealed a typical picture of post-encephalitic Parkinsonism. This has been described in detail in a publication with Dr. Stanley Cobb "On the Pathogenesis of Paralysis Agitans."(6)

It is not possible to determine how many cases of post-encephalitic behavior problems and mental deficiency are to be attributed to this specific type of encephalitis, which fortunately has become rarer in the recent decade.

*Rheumatic encephalitis*

New observations seem to throw light on another type of encephalitis, which is still little known. Two cases which I saw at autopsy in 1941 showed signs of encephalitis in the brain, but the picture was so different from anything I had seen before that I was not able to classify these cases properly. In the cortex there were found diffuse areas of devastation (*"Veroedungsherde"*) which sometimes showed capillary proliferation and gliosis. The leptomeninges were thickened, and many vessels showed a particular type of endarteritis. The possibility of congenital syphilis was considered, but the picture was too different in many details for these new cases to be classified as syphilitic. It was not until 1946, when I saw the exhibition of Dr. Walter L. Bruetsch at the convention of the American Psychiatric Association in Chicago, that I realized the true character of the pathologic lesions. Dr. Bruetsch has emphasized for many years the importance of chronic rheumatic brain disease as a possible factor in the causation of certain cases of mental disease(7). His pictures of the brain lesions were identical with those which I had seen in my cases. When I returned to a study of the heart and vascular system in these 2 cases, I found that in both cases rheumatic endocarditis had been diagnosed independently.

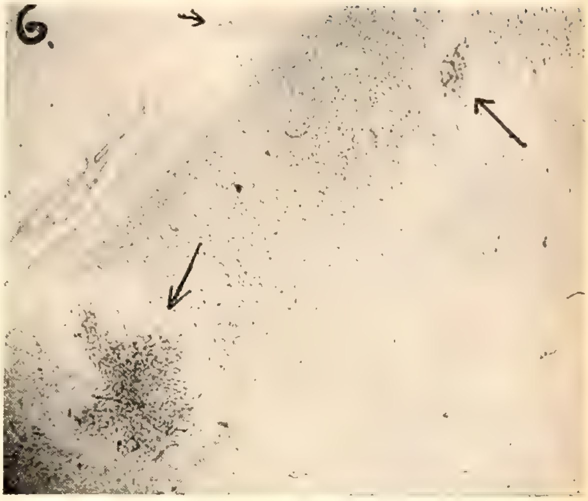

**Fig. 6. Cortex scars in a case of chronic rheumatic encephalitis. Note the areas of devastation, with loss of all nerve cells. In the center of the areas capillary proliferation with fibrinous exudate is present.**

The pathologic picture of chronic rheumatic brain disease consists of endarteritis of the smaller vessels, which are sometimes completely occluded by granulations. The endarteritis involves also the capillaries leading into the gray matter of the cortex. What is most impressive are the areas of devastation which are scattered through the gray matter. In those areas the nerve cells are completely destroyed, and the gray matter is either empty or filled with vascular scars of varying size. These scattered scars are likely to produce incoherent behavior and mentation, and a patient with such brain scars may be diagnosed as psychotic, men-

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6. Benda, C. E., and Cobb, S.: On the Pathogenesis of Paralysis Agitans (Parkinson's Disease), Medicine 21:95-142 (May) 1942.

7. (a) Bruetsch, W. L.: Chronic Rheumatic Brain Disease as a Possible Factor in the Causation of Some Cases of Dementia Praecox, Am. J. Psychiat. 97:276-296 (Sept.) 1940.
(b) Bruetsch, W. L.: Late Cerebral Sequelae of Rheumatic Fever, Arch. Int. Med. 73:472-476 (June) 1944.

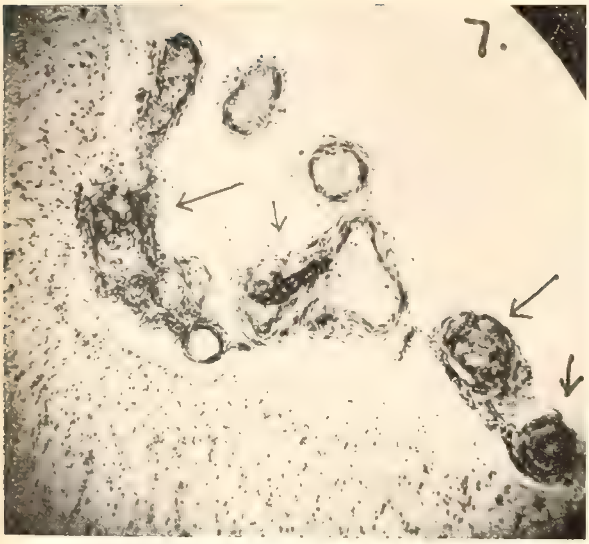

**Fig. 7. Meningeal vessels with rheumatic endarteritis. Note the occlusion of several vessels and the fibrous proliferation of the perivascular tissue.**

tally deficient, or a behavior problem.

The importance of chronic rheumatic infection as a cause of chronic encephalitis may eventually surpass that of congenital syphilis. The significance of these observations is further emphasized by a third case.

A girl (case 41/62) who was born in 1921 is said to have started to talk at 8 months and to walk at 14 months. She had a "brain fever" at the age of 19 months, and following this episode she was unable to walk and was badly deformed. She did not talk for three years after this illness. During her illness she had convulsions which continued to appear intermittently for the next ten years. The child had a rather pleasant and happy disposition, but was very restless. It was noted that her arms were in constant motion, and were moved in a jerky way. The legs were spastic, and her spine was completely bent so that her head faced her legs.

A neurologic examination which I made in 1937 showed a dystonia of the trunk and extremities. There was a striking disorder of posture. The spine of the child was bent to the left in a bow-like circle, and she was not able to stretch her back or to sit in an upright position. The head was bent to the left shoulder and could be turned only with great difficulty. Both arms could be used for some coarse motions, but there was a striking lack of coordination. The left leg could be bent at the knee and stretched out, but this movement had to be performed against marked spasticity. Her motions were atactic and uncontrolled. The right leg was stretched and could not be bent even with force. The Babinski was positive on both sides and knee jerks were very active. The girl was fairly bright and she moved with some skill upon the floor. She understood very well, but her speech was defective. She was good-hearted, but irritable and fearful. The neurologic examination revealed some peculiar findings which did not fit into the diagnosis of "infantile spastic paralysis." The bending of the trunk was like a torsion spasm, torticollis, and dystonia.

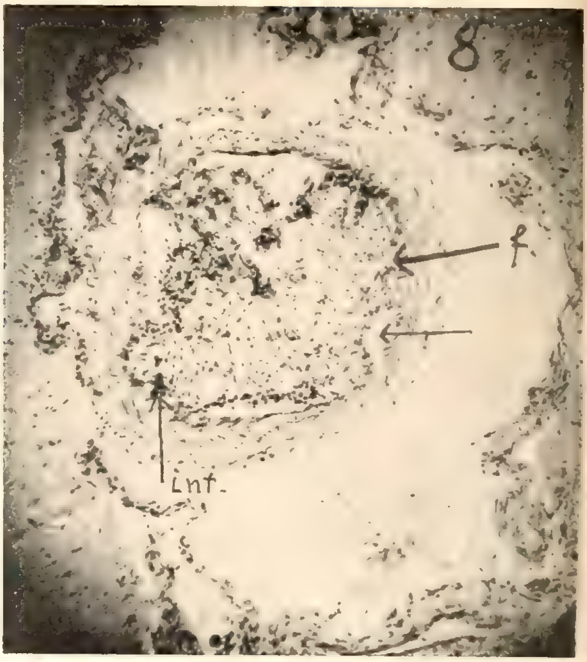

**Fig. 8. Higher power magnification of one of the meningeal arteries. Note the fibrous occlusion of the vessel by subendothelial fiber tissue proliferating into the vessel lumen. Some endothelial cell-nests from intima cells are present within the proliferated fiber tissue.**

The girl lived to be 19. The brain, which weighed 1245 Gm. and was well developed, showed signs of encephalitis which was still in an active stage at the time of death. The cortex showed the same pathologic picture seen in the 2 other cases previously mentioned—areas of devastation and a very active endarteritis with some nodule formation and glia scars. There was in addition, however, severe involvement of the basal ganglia and cerebellum; the substantia nigra was spared. Examination of the heart showed a slight increase of the pericardial fluid. The mitral valve contained a rigid opening which admitted only one finger. The edge of the cusps formed a thickened ring and the lower surface of the cusps was covered with vegetations which were adhesive and could not be removed. One of the cusps was adherent to the wall of the ventricles. The papillary muscles and tendinous strings were replaced by reddish-white masses of fibrinoid tissue which attached the muscle to the wall. The opening of the tricuspid valve admitted only one finger. The diagnosis was "old rheumatic endocarditis with adhesions, vegetations, and mitral stenosis."

Cases of torsion spasm or dystonia musculorum are not rare and have been observed to develop in teen-aged children. They have puzzled neurologists for a long time because the picture is so inconsistent. Some writers were inclined to consider this condition a manifestation of hysteria. The evidence that the case described above was due to chronic rheumatic encephalitis throws new light upon the problem of torsion dystonia. If it should be proved that this condition is sometimes due to chronic rheumatic encephalitis, I am sure that a therapeutic approach will finally be developed.

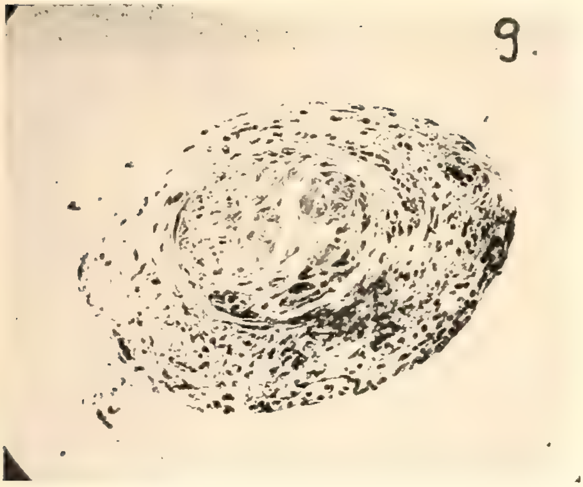

**Fig. 9. Vessels of the heart in a patient with rheumatic endarteritis (case 3). Note that the patterns of vascular pathology are essentially the same as those seen in the meningeal vessels.**

### *Familial oligoencephaly*

Limitations of time make it impossible for me to discuss each of the other pathologic entities represented in this series of 200 autopsies. The category which many may consider the most important one is that of familial mental deficiency, including morons and high-grade imbeciles. The greatest proportion of cases of mental deficiency fall into the category which may be called "endogenous" or "primary," "intrinsic" or "familial." While one school of thought emphasizes the hereditary character of this condition, there are other publications which stress the environmental conditioning of feeble-mindedness. The autopsy findings in the 35 cases of our series which came under this classification justify the statement that the endogenous group is, from a neuropathologic point of view, a morbid entity which may be called "oligoencephaly."(8)

The study of the spinal cord in these patients proved to be of great advantage, because the spinal cord shows normally rather standardized and symmetrical patterns which are readily studied and compared with other material. In the endogenous cases of mental deficiency an overwhelming number showed abnormalities in the development of the spinal cord and of the brain which indicate that the abnormal development takes place during the early months of prenatal life. These anomalies of the spine, which can be classified pathologically as "spinal dysraphia" or "myelodysplasia," consist in asymmetry of the two halves of the gray matter, anomalies in the differentiation of the central canal, and anomalies in the structure of the white matter. These anomalies of development are usually not associated with striking neurologic abnormalities, but we must remember that our routine neurologic examinations can disclose only the more striking anomalies. More careful functional examination, such as that made by Drs. Yakovlev and Farrell(9), has revealed anomalies in the Babinski reflex which would otherwise have escaped attention.

Anomalies in differentiation similar to those seen in the spinal cord can be discovered in the brain and cerebellum. The Purkinje cells, for instance, which are in the normal brain lined up like soldiers, are strikingly abnormal in cases of oligoencephaly. The cerebral hemispheres are abnormally asymmetrical, and the nerve cells show many anomalies in structure and distribution. They seem to indicate that the endogenous type of mental deficiency is a developmental disorder of differentiation starting early in prenatal life and is, therefore, removed from any effective therapeutic influence after birth. Because of the many unusual physical characteristics of the oligoencephalic patient, such as asymmetry of the two sides of the body, high arched palate, cleft formations, vascular autonomic deficiencies, and anomalies of hands and feet, this condition can usually be diagnosed during life.

### *Conclusion*

A survey of 200 autopsies performed on mental defectives indicates that a great variety of pathologic influences operating before birth, at birth, and after birth, are the reasons for mental deficiency. Mental deficiency, with its great social and economic implications, deserves an equal place beside mental illness and neurologic conditions in the field of neuropsychiatry. From a merely custodial and educational problem, mental deficiency has to evolve as a medical problem for which we need adequate hospital facilities and diagnostic laboratories which will enable us to handle these cases according to their needs.

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8. Benda, C. E.: The Familial Imbecile or Oligo-Encephaly as a Morbid Entity, Am. J. Ment. Deficiency 49:32-42 (July) 1944.

9. Yakovlev, P. I., and Farrell, M. J.: Influence of Locomotion on the Plantar Reflex in Normal and in Physically and Mentally Inferior Persons, Arch. Neurol. & Psychiat. 46:322-330 (Aug.) 1941.

An analysis of the material shows that increased knowledge of prenatal pathology, more courageous surgery in cases of birth injuries, and improved methods of treating the infectious and metabolic disorders of childhood will greatly change the aspect of mental deficiency. This problem offers a wide field of investigation for pediatricians, surgeons, and neuropsychiatrists; each of these specialists will find a number of cases which could be prevented or ameliorated by early and proper attention.

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# REPORT OF A PATIENT TOLERATING CRYSTALLINE PENICILLIN WITHOUT REACTION AFTER REPEATED CUTANEOUS REACTIONS TO CRUDE PENICILLIN

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It is debatable whether or not penicillin *per se* produces untoward reactions in man. In a previous study at this clinic(1) it was impossible to demonstrate an antigen-antibody reaction to penicillin or contaminants of penicillin in five persons who developed urticaria associated with therapy with unpurified penicillin.

Until recently, we felt that there were few reactions encountered with penicillin therapy which justified termination of treatment when the antibiotic was definitely indicated. Recently, however, a case of exfoliative dermatitis apparently due to non-crystalline penicillin has been observed. We have come to believe that any patient who develops a diffuse erythema with edema of the skin associated with penicillin therapy is a potential candidate for exfoliative dermatitis. Farrington and Tamura(2) have observed a patient with exfoliative dermatitis attributed to therapy with crude penicillin.

## *Report of Case*

### *History*

K.E.C., a 35-year-old white male taxi driver, was admitted to the hospital because of shortness of breath of two to three years' duration, which had become worse during the previous six months. The family history was negative except that all his relatives were said to have "prominent eyes." The patient had been married for eight years and his wife had never been pregnant.

The past history revealed that the patient had never experienced objective symptoms of active rheumatic fever, but had known for many years that he had a "leaking heart," which had never caused symptoms. He served with the marines from 1931 to 1935, but was subsequently rejected by the army in 1942 for reasons unknown to the patient. In 1934 he had primary syphilis, for which he received about twelve intravenous injections (arsenicals) and twelve intramuscular injections (bismuth). He stated that after receiving this amount of treatment he was told that his blood serologic tests for syphilis were negative. His wife was known to have had negative blood tests.

Insofar as the patient was concerned, his real illness began about eight years prior to this hospitalization. At that time he began to have classic episodes of paroxysmal auricular tachycardia, relieved by orbital pressure and by pressure over the region of the carotid sinuses. The frequency of the above episodes had increased until he had symptoms almost daily; he was able to terminate the attacks within a few minutes by orbital pressure, however.

For two to three years prior to admission, he had experienced mild exertional dyspnea, but had continued to work until fifteen months before he was admitted to Duke Hospital. At that time he was studied in another clinic, where hyperthyroidism was suspected. The basal metabolic rate was found to be +21 and +24 on two successive determinations. He was started on digitalis and thiouracil, and was placed on a low-salt diet. After three weeks the basal metabolic rate was found to be +15, and the thiouracil was discontinued. Since that time the patient had been confined to bed most of the time because of exertional dyspnea and orthopnea: he had continued on a maintenance dose of digitalis.

### *Physical examination*

The patient was moderately well developed and was orthopneic. The skin was rather pallid, and the mucous membranes were pale. Definite bilateral exophthalmus was present, but no lid lag or weakness on convergence was noted. The thyroid gland was not palpable. The apical impulse of the heart was in the left mid-axillary line, and a soft, nontransmitted diastolic murmur was heard over the aortic area. The blood pressure was 172 systolic, 120 diastolic. Moist rales were heard over the left lower lung field, most of which disappeared after coughing. The liver was not actually felt, but tenderness and a sense of resistance were present beneath the right costal margin. The prostate was normal to palpation by rectum, and there was no peripheral edema or venous engorgement. No other abnormal physical findings were noted.

It was the impression of the examiner that the patient had hypertensive cardiovascular disease with moderate cardiac failure and functional aortic regurgitation.

### *Accessory clinical findings*

The hemoglobin was 79 per cent (Sahli); there were 4,210,000 red blood cells and 7000 white blood

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From the Division of Dermatology and Syphilology of the Department of Medicine, Duke University School of Medicine, Durham, North Carolina.

1. Callaway, J. L., and Barefoot, S. W.: Immunological Studies on Patients Developing Urticaria Associated with Penicillin Therapy, J. Invest. Dermat. 7:285 (Dec.) 1946.
2. Farrington, J. and Tamura, J.: Cutaneous Testing in a Case of Exfoliative Dermatitis Caused by Penicillin, Arch. Dermat. & Syphil., in press.

cells; the differential count was normal. Blood serologic tests for syphilis were negative. The urine was yellow and clear, with a specific gravity of 1.009, a heavy trace of albumin, and no sugar; microscopic examination of the centrifuged sediment showed an occasional red blood cell, 1-2 coarse granular casts, and 1-3 white blood cells per high power field, with clumping. Stool examination was negative for ova and parasites. The blood nonprotein nitrogen was 55 mg. per 100 cc.; urea nitrogen 37.2 mg. per 100 cc.; urea ratio 67.6; total proteins 6.9 Gm. per 100 cc., with albumin constituting 4.5 Gm. and globulin 2.4 Gm. The albumin-globulin ratio was 1.8. Blood cholesterol was 170 mg. per 100 cc.

The basal metabolic rate was +25 on the third hospital day, +4 on the seventh hospital day, and +3 on the twentieth hospital day. The temperature was normal at the time of each basal metabolic reading.

X-ray and fluoroscopic examination of the chest showed the lungs to be clear. The heart was enlarged, especially to the left, and the aorta showed moderate tortuosity. Retrograde pyelograms suggested polycystic kidneys or chronic bilateral pyelonephritis; the urologic consultant was unable to make the differential diagnosis, but found that he had a urethral stricture.

Two phenolsulfonphthalein renal excretion tests were done. The first showed a total excretion of 28 per cent in two hours, and the second an excretion of 26 per cent. A Mosenthal test showed a maximum concentration of 1.013.

### *Course in hospital*

The patient was digitalized and given a low-salt diet with fluid restriction. He showed satisfactory progress insofar as his cardiac status was concerned. On the second hospital day he developed a furuncle in the region of the left knee, and one week later he was started on 20,000 units of non-crystalline penicillin every three hours. About six hours after the first injection of penicillin, urticaria developed, followed in twenty-four hours by a generalized erythema which had almost completely disappeared twenty-four hours later. Because of the cutaneous reaction he received only three doses of penicillin.

After ten days without penicillin, a severe generalized furunculosis had developed. The azotemia continued to increase, and on the fifth hospital day the blood nonprotein nitrogen was 126 mg. per 100 cc. A culture from one of the furuncles revealed hemolytic and non-hemolytic Staphylococcus aureus. The white cell count was never above 15,000 and the temperature was never above 38.5 C. (101.3 F), although the patient was obviously quite ill. It was feared that he might develop a staphylococcus septicemia. The advisability of sulfonamide therapy was considered, but these drugs were not given because of renal damage. The use of staphylococcus antitoxin was also considered inadvisable because of the fact that there was no shift to the left in the Schilling hemogram. Finally, on the twentieth hospital day, non-crystalline sodium penicillin was resumed in a dosage of 20,000 units every three hours; it was discontinued after five doses, however, because the patient again developed generalized erythema and edema of the skin, associated with severe pruritius. At that time he also experienced an acute exacerbation of a chronic tinea cruris, and of a chronic dermatophytosis between the toes.

At this time the patient appeared to be **in extremis**. We were unwilling to submit him to further therapy with non-crystalline penicillin for fear that he would develop an exfoliative dermatitis which might prove fatal if superimposed on his serious systemic disease. At that time he was given intradermal skin tests to non-crystalline penicillin and to crystalline penicillin G in dilutions of 1000 units per cubic centimeter of saline. The crystalline penicillin G gave no reaction whatsoever, while the unpurified penicillin produced a 2-cm. area of erythema and induration thirty minutes after the intracutaneous injection. At twenty-four and forty-eight hours this reaction was not evident.

On the thirtieth hospital day, the patient was started on 20,000 units of crystalline penicillin G every three hours, and experienced no reaction whatsoever. The dose was subsequently increased to 150,000 units every three hours, without any untoward reaction. On this therapy the multiple furuncles and carbuncles began to localize, and were eventually incised and drained. The patient made satisfactory progress, his temperature and white cell count returning to normal. On the sixty-fourth hospital day his blood nonprotein nitrogen was 52 mg. per 100 cc. He was discharged two days later.

## *Summary and Conclusions*

In our opinion the outcome of this case would have been fatal without the administration of penicillin. On two occasions the patient showed cutaneous reactions to non-crystalline sodium penicillin, and he also exhibited a positive intracutaneous test to this substance. Subsequently he was able to tolerate crystalline penicillin without any reaction whatsoever. We believe that this experience proves that, in some patients at least, the reactions which have been observed with the administration of commercial penicillin are due to the incorporated impurities rather than to the penicillin *per se*(3).

3. Since this paper was prepared, 3 other patients who did not tolerate non-crystalline penicillin were able to tolerate crystalline penicillin "G".

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**The comprehensive viewpoint.** Osler's insistence on a solid pathologic foundation for medical understanding and his careful clinical observations marked an epoch in the development of medicine. Unfortunately his warmth and human understanding and his intuitive appreciation of emotional factors in illness could not become a part of our medical heritage. The body is still divided into many organs and systems, specialists look upon disease from their narrow viewpoint, and the curriculum is built up by introducing more and more special points of view. As a consequence, the comprehensive viewpoint, which is so necessary to the study of illness as an aspect of behavior, can make little headway. The medical history form which we give to our medical students reflects this organic approach and this age of specialization, and as a consequence we look in vain throughout a long history for some evidence of the human being who is sick.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:160 (Nov.) 1946.

# THE USE OF RECTAL PENTOTHAL SODIUM IN OBSTETRICS

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Although the ideal anesthetic for obstetric cases has not yet been discovered, the use of rectal pentothal in conjunction with demerol and scopolamine intramuscularly seems to provide a close approach to the ideal means of assisting the mother through the apprehension, fear, and pains of labor.

After employing intravenous pentothal both in private practice preceding the outbreak of the war and in the combat areas during the war, I had the opportunity of using it in the treatment of many combat soldiers who were returned to this country because of moderate and severe anxiety states, battle fatigue, and numerous other disturbances of a psychogenic nature(1). Hellman and his co-workers(2) reported a series of 1415 deliveries under sodium pentothal anesthesia given by the intravenous method. Although they were very enthusiastic about the use of this drug in operative cases, they stated that intravenous sodium pentothal anesthesia is not suitable for spontaneous delivery; the patient, semi-conscious, often moves about under the stimulation of pains, so that the needle frequently becomes dislodged from the vein and gives rise to serious mechanical difficulties.

After my return to private practice, I began to use pentothal sodium *per rectum* in the majority of obstetric cases. While I realize that no absolute conclusions can be made on the basis of my small series of 30 cases, I am presenting this paper in the hope of stimulating further study on the use of rectal pentothal in obstetrics.

## *Dosage*

Reports on the use of rectal pentothal in obstetrics have been published by Tonn(3) and by Kotz and Kaufman(4). In both these reports the suggested dosage is 1 Gm. of pentothal per 50 pounds of weight, and Tonn states that "the dosage necessary for continued anesthesia was found to be about 1 gram about 1½ hours after the primary instillation, and repeated again when necessary." It has been our experience, however, that the intramuscular administration of demerol in doses of 50 to 100 mg. (1 to 2 cc.) and of scopolamine in doses of 1/200 grain during the first stage of labor greatly enhances the action of rectal pentothal and reduces the required dosage of the latter drug. In our series a single dose of 1 Gm. per 65 pounds of body weight proved to be sufficient in practically every case. We have never found it necessary to use more than a total of 1/100 grain of scopolamine in any labor.

## *Method of Administration*

On admission, a careful physical examination is done. This includes a rectal examination, following which the nurse prepares the patient with a thorough scrub, shave, and a good cleansing saline enema. (Tonn(3) and Weinstein(5) have reported that a soapsuds enema seems to lessen the effect of the drug.)

Prior to the administration of pentothal, demerol and occasionally scopolamine are administered intramuscularly at one- to three-hour intervals until the cervix has dilated to about 3 cm. in multiparous patients and to 4 cm. in primiparas. When a primipara has a long, slowly effacing cervix, pentothal is sometimes withheld until effacement is almost complete.

Each patient has been weighed on recent visits to the clinic prior to admission to the maternity ward. In order to prevent an enema effect, the calculated dose of pentothal is mixed so that 7 cc. of water is used for each gram of pentothal. A French catheter, size 12 to 16, is then attached to a 30 cc. syringe containing the pentothal mixture. After lubrication, the catheter is inserted for 6 to 8 inches into the rectum, with the patient in the prone position on her left side. Following instillation of the drug, the catheter is rapidly withdrawn and pressure is exerted against the anal orifice with a gauze sponge to prevent any loss of the drug. A sensation of drowsiness and tingling in the

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Read before the Seabord Medical Association, Kinston, December 3-5, 1946.

1. Grinker, Roy R. and Spiegel, John P.: Men under Stress, Philadelphia, Blakiston, 1945.
2. Hellman, L. M., Shettles, L. B., Manahan, C. P., and Eastman, N. J.: Sodium Pentothal Anesthesia in Obstetrics, Am. J. Obst. & Gynec. 48:851-860 (Dec.) 1944.
3. Tonn, G. R.: Experience with Rectal "Pentothal" Sodium in Obstetrics, South. M. J. 39:154-157 (Feb.) 1946.
4. Kotz, J. and Kaufman, M. S.: Present Status of Obstetrical Anesthesia, Anesth. & Analg. 23:66-73 (March-April) 1944.
5. (a) Weinstein, M. L. and Light, G. A.: Basal Anesthesia with Pentothal Sodium, Anesth. & Analg. 22:68-80 (March-April) 1943; (b) Weinstein, M. L.: Rectal Pentothal Sodium: A New Pre- and Basal Anesthetic Drug in the Practice of Surgery, Anesth. & Analg. 18:221-223 (July-Aug.) 1939; (c) Weinstein, M. L. and Adams, E. L.: Further Observations on the Use of Rectal Sodium Pentothal, Anesth. & Analg. 20:229-232 (July-Aug.) 1941.

extremities usually ensues within two to five minutes.

Inhalations of nitrous oxide and oxygen are occasionally instituted during the second stage of labor, when additional doses of pentothal would be necessary otherwise. The required mixture may vary considerably in different patients(6), but the proportion of nitrous oxide need not be greater than 50 to 80 per cent. With the use of this routine, we have never found it necessary to administer rectal pentothal a second time.

Whenever necessary, perineal repair is performed with little or no discomfort to the patient by the use of metycaine or novocaine instilled locally. This is done by "orange-peeling" the perineum with one of these local anesthetic agents along the direction of the anticipated left mediolateral episiotomy as the perineum is stretched by the oncoming fetus.

It was found unnecessary to resort to the use of antidotes in our series of cases. However, 100 per cent oxygen should be available for an emergency in case of overdosage. Coramine, metrazol, 0.3 per cent picrotoxin, and 10 mg. of benzedrine sulfate in 1 cc. ampules for intravenous administration may also be used in cases of barbiturate poisoning.

### *Effects on the Mother and Child*

In our series of 30 deliveries, complete analgesia and amnesia were experienced by all except 2 mothers. These two were the first patients delivered in our clinic by this method, and neither demerol nor scopolamine was used. Although most of the pains were relieved, nitrous oxide and oxygen were employed in these 2 cases after the cervix was completely dilated. In practically every other case the patient slept continuously, the anesthetic effects beginning within three to fifteen minutes following the rectal administration of the pentothal. Although the mother usually regained full consciousness within 30 to 60 minutes after being returned to her room, drowsiness and complete relaxation frequently continued for two to eight hours thereafter. No untoward reactions to the drug were noted.

It is believed that the cervical and perineal relaxation brought about by rectal pentothal serves to shorten the first stage of labor, thus reducing the death rate in babies during the first week of life. No maternal or fetal death has occurred in our series, and there were only 3 cases in which the baby required cardiac or respiratory stimulation, or both. It is our belief that the apnea in these 3 cases was attributable to causes other than rectal pentothal. In all other cases, the baby began life with a lusty cry immediately following delivery.

### *Possible Contraindications*

In view of the fact that pentothal may be eliminated through the liver and may add to degenerative changes in that organ, one should be cautious in employing this drug in pre-eclampsia. Weinstein and his co-workers, however, have reported that neither partial hepatectomies nor unilateral nephrectomies affected the duration of anesthesia with sodium pentothal in rats(5). This finding would indicate that neither the liver nor the kidneys contribute to the destruction of the drug in the body.

In cases of prematurity, it might be advisable to use some other anesthetic in order to avoid the possibility of inhibiting the initial respiratory effort in the newborn infant. Hellman and his co-workers(2) state:

> "This possibility cannot be denied, but on the other hand, it may be stated that our prematurity mortality with sodium pentothal has been slightly less than with other forms of anesthesia . . . as far as we have been able to determine, there was no instance in the entire series of 1,415 cases delivered under sodium pentothal anesthesia (intravenously) in which this anesthetic agent was directly responsible for an infant's death, or in which it played any demonstrable role."

Employment of pentothal is contraindicated in patients with any involvement of the glottis, trachea, or other organs which might cause respiratory embarrassment. It has been our observation that, excluding primiparas with malpositions or pelvic anomalies, cases of pre-eclampsia or prematurity, and patients with primary anemias or dangerous heart conditions with decompensation, this drug can safely be used in practically all other types of obstetric cases. It is believed that nembutal, seconal, and other barbiturates should not be used in conjunction with rectal pentothal.

### *Summary*

1. We have found sodium pentothal, administered rectally in small volume, to be a satisfactory anesthetic agent in obstetric cases, especially when it is used in conjunc-

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6. Lundy, J. S. et al.: Annual Report for 1945 of the Section on Anesthesiology, Proc. Staff Meet., Mayo Clin. 21:301-313 (Aug. 7) 1946.

tion with demerol and scopolamine given intramuscularly. It is not the purpose of this paper to claim that it is the anesthetic of choice in all cases, or even that it is the best anesthetic available.

2. The dose of the drug can be easily calculated, and it is easily administered. The patient is usually quieter and much less apprehensive under sodium pentothal anesthesia than with the other barbiturates. In addition, the mental stress suffered by many patients under spinal anesthesia is eliminated.

3. Very little inhalation anesthesia is needed, and induction with nitrous oxide and oxygen is smooth.

4. No depressive after-effects were noted following the use of pentothal, and the patients awakened soon after delivery.

5. The child usually displayed a healthy pink color, and respiratory difficulty was seldom noted. No ill effects on the baby could be traced to the careful use of pentothal.

6. The first stage of labor is shortened by rectal pentothal, and we noted no tendency toward hemorrhage, relaxation of the uterus, or placental retention.

7. Total amnesia was present in almost every case, this state being reached shortly after administration of the drug and continuing until the patient had been returned to her room.

8. All patients were pleased with their experience with the drug, and multiparas stated that it was much better than anesthetics used in previous deliveries.

### *Conclusion*

I have used pentothal sodium rectally, in conjunction with demerol and scopolamine intramuscularly, in 30 deliveries, with satisfactory results. It is believed to be the least dangerous of the barbiturates in normal labor. Like any general anesthetic, however, the drug should be used with caution, especially in cases of pre-eclampsia and prematurity.

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**We need not assume that tuberculosis is permanently and ineradicably engrafted upon our civilization.** On the contrary, the evidence indicates that in this country the balance is already against the survival of the tubercle bacillus; and we may reasonably expect that the disease will eventually be eradicated. There can be no certainty of this result, but it is an expectation sufficiently well grounded to justify shaping our tuberculosis control program toward this definite end. — Wade Hampton Frost, Am. Jour. of Pub. Health, August, 1937.

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# DEMEROL-SCOPOLAMINE ANALGESIA IN LABOR

John Cotten Tayloe, M.D.
Washington

Five years of intensive research and practical experience with the use of demerol in more than 8000 published and thousands of unpublished cases have established this drug as an effective analgesic agent in labor. Demerol-scopolamine analgesia is apparently harmless to mother and baby. It does not weaken uterine contractions or prolong labor, and there are no postpartum complications known to be due to this combination of drugs.

Demerol is a synthetic drug. Chemically, it is the hydrochloride of the ethyl ester of 1-methyl 4-phenyl piperidine 4-carboxylic acid(1). Demerol exhibits properties analogous to those of both atropine and morphine. Its analgesic potency is midway between that of codeine and morphine, and its spasmolytic effect is slightly weaker than that of atropine. It relaxes smooth muscles, and in that respect differs from morphine. Demerol causes no demonstrable effect on the kidney function or blood pressure, and is rapidly eliminated from the body. It does not depress the respiratory center of either the mother or the baby, and the vast majority of babies born under demerol analgesia cry immediately or soon after birth. In Schumann's series(2) 82 per cent of the babies breathed at once; while 15 per cent were somewhat slow to breathe, this percentage is not unusually high. Some of the disagreeable effects of demerol are nausea, dizziness, pallor, and dryness of the mouth; these occur only occasionally, however, and are of no serious consequence.

Since demerol has no amnesic effect, it has been used in combination with the barbiturates, nembutal and seconal, or with scopolamine(3). Reports on the use of demerol in England(4) and in this country have shown that demerol alone in doses of 100 to 650 mg. produces satisfactory analgesia in labor;

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Read before the Seaboard Medical Society, Kinston, December 3-5, 1946.

1. Literature on demerol from the Winthrop Chemical Company, Inc.
2. Schumann, W. R.: Demerol (S-140) and Scopolamine in Labor; Study of 1,000 Cases, Am. J. Obst. & Gynec. 47: 93-104 (Jan.) 1944.
3. Carter, H. M.: The Role of Demerol in Obstetrics, Wisconsin M. J. 44:1170-2 (Dec.) 1945.
4. Cripps, J. A. R., Hall, B. and Haultain, W. F. T.: Analgesia in Labor: Record of 102 Cases Treated with Pethidine, Brit. M. J. 2:498-500 (Oct. 14) 1944.

amnesia results if scopolamine or a barbiturate, such as seconal or nembutal, is given in combination with it. Labor is shortened somewhat by the antispasmodic action of demerol on the cervix(4).

Scopolamine and demerol are especially indicated for preoperative analgesia when cesarean section is to be performed under local, spinal, or ether anesthesia. When these drugs are given preoperatively, the baby is usually vigorous and prompt to cry, and the mother is in excellent condition. Demerol is also useful as an analgesic agent in mothers giving birth to premature babies, since it does not depress the baby's respiratory center(5). Statistics show that 91 per cent of premature babies born under demerol analgesia are in satisfactory condition at birth(2).

### *Experience with the Use of Demerol-Scopolamine Analgesia at the Tayloe Hospital*

For a number of years in the past I had been using morphine, scopolamine, and one of the barbiturates (nembutal) with excellent analgesic and amnesic effect in labor. In many cases, however, the mothers who were given this combination of drugs were very restless and uncooperative, and the babies were sometimes resuscitated with much difficulty and were slow in learning to nurse. Morphine is known to have a depressing effect on the respiratory center.

Between March 20, 1946, and November 20, 1946, there were 589 deliveries in the Tayloe Hospital. During this period morphine, scopolamine, and nembutal were given to 233 patients, and a combination of demerol and scopolamine to 356 patients in labor—191 primiparas and 165 multiparas. These drugs were also used as a pre-anesthetic analgesic in 15 cesarean sections.

There was no routine method of administering demerol and scopolamine; each case was individualized. The patients were told that when they wanted something to relieve the pain, they could have it. Most patients asked for an analgesic as soon as regular contractions were definitely established and the pains were occurring about every eight to ten minutes. Nembutal, grains 3, was given at first by mouth to the majority of primiparas. After a short interval—thirty to sixty minutes—100 mg. of demerol and 1/100 to 1/150 grain of scopolamine were given intramuscularly. This dose of demerol and scopolamine was repeated as often as necessary to relieve pain — seldom more often than every two hours. In 13 multiparas, when the labor was rapid and dilatation of the cervix was nearly complete, 100 mg. of demerol in 10 cc. of sterile water was given slowly by the intravenous route with 1/100 grain of scopolamine. Splendid analgesic and amnesic effect was obtained.

Demerol usually produces its analgesic effect in about twenty minutes, and the patient often sleeps between pains. Successful analgesia and amnesia were achieved in approximately 70 per cent of the 356 patients who were given demerol and scopolamine; all experienced some degree of amnesia and analgesia.

There were 4 premature stillbirths in this series and 2 fetal deaths from intracranial hemorrhage which could not be attributed to demerol and scopolamine. Approximately 83 per cent of the babies were very active, and breathed and cried immediately after birth. The remainder required only a minimum of stimulation and were in excellent condition a short time after birth.

### *Conclusions*

From reports which I have read and from the observation of this small series of cases, it is my opinion that demerol with scopolamine is a safe and efficient means of providing analgesia and amnesia in labor, for the following reasons:

(1) It does not endanger the life of the mother or have any harmful effect on her. (2) It has no harmful effect on the child. (3) It does not prolong labor, and the necessity for operative interference is not increased by its use. (4) It does not prolong the third stage of labor and does not tend to cause postpartum hemorrhage. (5) It is simple to give, and there are no risks associated with its administration.

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If patients were allowed to talk more and were examined less it would be a good thing for medicine in general. As one of our patients, who had been through the mill of medical investigation recently remarked, she was suffering from "testitis." Indeed how numerous are the patients who have been examined again and again by means of the x-ray, chemical studies, and various other expensive and complicated methods, accumulating a sheaf of papers, and with an end result harmful rather than helpful because the diagnosis was obscured by concentration on a part rather than on the whole.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:160 (Nov.) 1946.

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5. Gilbert, G. and Dixon, A. B.: Observation on Demerol as an Obstetric Analgesia, Am. J. Obst. & Gynec. 45:320-326 (Feb.) 1943.

## "SMALL UNRECOGNIZED STROKES"

LT. E. S. MARKS, M.C.
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For many years Dr. Walter C. Alvarez has been writing and talking, with his usual clarity and common sense, about thromboses of small cerebral vessels in "silent" areas of the brain. Although such strokes are quite common and are easily recognized if one is on the look-out for the condition, the fact that most patients have no paralysis or other frank neurologic signs causes them to be overlooked by many physicians. Except for the writings of Alvarez(1), there is very little to be found about this condition in medical literature(2).

I do not expect to add anything original to the knowledge of this condition, since Alvarez has covered the ground thoroughly —especially in *Geriatrics* for May-June, 1946(1f). The purpose of this article is to emphasize the frequent occurrence of small unrecognized strokes, and the fact that such strokes usually simulate disorders of the gastrointestinal tract. The fact that 4 patients with fairly typical histories of "silent strokes" were admitted to the North Carolina Baptist Hospital on one private medical service in six weeks shows how common this condition is. The additional fact that all four were sent in as gastroenterologic problems warrants another paper on the subject, using these 4 consecutive cases as a basis.

### *Diagnosis*

The only way to diagnose a small stroke is by a carefully taken history. Physical findings and laboratory procedures offer little, if any, help. The characteristic feature of a small stroke is its *suddenness of onset.* At a certain minute of a certain day a well person at or past middle age suddenly becomes ill, and thereafter never regains his former health.

The onset may be marked by a dizzy spell or sudden mental confusion. Some patients fall to the ground, and for a short time afterwards are mentally confused. In others sudden abdominal pain is the first symptom. Many silent strokes probably occur during sleep, when the blood pressure is low, and the patient awakens in the morning feeling ill, with headache or abdominal distress. If a history of sudden transient dysphonia or ropy saliva is also elicited, the diagnosis of a small stroke is further strengthened. In some cases even a slight paralysis may be found. Both large and small strokes may occur in the same patient.

Very few small strokes are diagnosed at the onset, but this is probably because most physicians are not on the look-out for this condition. Many of these patients are referred to the gastroenterologist because of anorexia, epigastric pain on eating, nausea, vomiting, constipation, distention, belching, flatus, sudden unexplained loss of weight, or sudden attacks of diarrhea. These gastrointestinal symptoms, for which needless operation is sometimes performed, are probably caused by involvement of the vagus nerve. Typical complaints other than those related to the gastrointestinal tract include weakness, tiredness, and a "run-down feeling." Often a diagnosis of a "nervous breakdown" is made.

Alvarez has described other ways in which a silent stroke may manifest itself. An aged person may suddenly begin to have insomnia, or to shuffle his feet and take small, unsteady steps. Many persons, previously healthy and good-natured, suddenly age, lose their ability to work, and perhaps become ill-natured and difficult to get along with. The patient may not notice the change in his personality, but his family and business associates will say that he suddenly lost his former drive and ambition, became forgetful, and apparently suffered a "nervous breakdown," from which he never fully recovered.

If the doctor has known the patient before, he may be led to suspect a small stroke by the sudden development of slovenly habits in a person who had previously taken pride in his appearance. Some of these patients lose interest in former pleasures, and actually can no longer tolerate them. Emotional instability is common, often leading to profound depression and perhaps thoughts of

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From the Department of Medicine, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, N. C.

1. Alvarez, W. C.: (a) Patients Who Are Incapacitated by a Little Indigestion, M. Clinics North America 15:1409-1417 (May) 1932. (b) Unrecognized "Strokes" and the Gastro-Enterologist, Am. J. Digest. Dis. & Nutrition 2:90-92 (April) 1935. (c) Small Unrecognized Strokes: A Cause of Puzzling Indigestion, Proc. Staff Meet., Mayo Clinic 10:293-296 (May 8) 1935. (d) Nervousness, Indigestion, and Pain, New York, Paul B. Hoeber, Inc., 1943, pp. 252-254. (e) Small Unrecognized Strokes: A Common Cause of Illness in Older Persons, J. Michigan M. Soc. 43:389-392 (May) 1944. (f) Cerebral Artriosclerosis, Geriatrics 1: 189-216 (May-June) 1946.
2. Evans, H. and Harding, G. T.: "Strokes" Without Paralysis: Problems of Diagnosis, Ohio State M. J. 34:768-773 (July) 1938.

suicide. Spells of crying without any apparent reason are another manifestation of emotional instability.

A fall in blood pressure following the onset of a patient's complaints is further evidence for a small stroke. Hypertension often, but not always, precedes a stroke. In most cases evidences of arteriosclerosis are found in the eyegrounds or peripheral arteries, or on x-ray films.

### *Prognosis*

Patients who have had small strokes seldom show much improvement, although they may live for many years after the first such episode. Telling the patient to "snap out of it" or to "buck up" will do no good. It is important to recognize this condition, however, since repeated diagnostic tests to rule out organic disease are a waste of money. Informing the family frankly of the nature of the disease will cause them to be more understanding with the patient. Since his ability to make decisions is often impaired or lost, he should be advised against assuming business responsibilities.

### *Treatment*

The only therapy for this condition is purely symptomatic. Sedatives and antispasmodics may be used as indicated, but will not give complete relief of symptoms.

### *Pathologic Findings*

In patients who have come to autopsy, the brain has shown many small necrotic areas due to thromboses. With each thrombosis the patient aged a bit and lost more of his ambition, drive, and ability to work.

### *Case Reports*

The following cases, which were seen on one private medical service within a period of six weeks, illustrate the histories and findings which are characteristic of the silent stroke.

#### *Case 1*

A 49-year-old married woman entered the hospital on March 29, 1945, for treatment of hypertension (nine years' duration), nausea and vomiting (about two years), and habituation to codeine (about six months). The patient had had repeated attacks of pyelonephritis since childhood, and was known to have had hypertension for at least nine years. During this period she had experienced three major strokes, the last leaving as a residuum a decrease in sensation over the entire left side of her body.

About two years before admission, the patient suddenly after dinner experienced pain in the right upper quadrant, followed by nausea and vomiting. Her nausea and vomiting continued, and from that moment on she lost her appetite. Her daughter, a trained nurse, testified that her mother had almost a complete change of personality, becoming apathetic and emotionally unstable. In her daughter's words, "She became almost like a child." She lost sixty pounds in weight.

In January, 1944, her left kidney was removed and the pathologist made a diagnosis of chronic pyelonephritis. She was given codeine for relief of pain after this operation, and had continued to use it.

Physical examination showed a well developed, well nourished woman who appeared mentally unstable and cried frequently for no apparent reason. Positive findings were arteriosclerotic changes in the retina, a blood pressure of 190 systolic, 135 diastolic, and slight enlargement of the heart. There was diminished sensation over the entire left side of the body.

Kidney function tests, blood chemistry studies, and x-ray examination of the stomach, duodenum, and gallbladder were normal. During her stay in the hospital her blood pressure varied between 190 and 120 systolic, 135 and 70 diastolic.

The final diagnosis was a small stroke, in addition to hypertension and previous hemiplegia.

#### *Case 2*

A 73-year-old farmer was well until September, 1944. At that time, while he was working in his watermelon patch, he had a sudden onset of epigastric pain. From that moment on he had anorexia, epigastric pain on eating (not related to amount of food), and bloating. He lost his cheerful, alert disposition and became querulous and apathetic. Although his local physician said that his blood pressure before the onset of his present illness had been elevated, it was found to be normal afterwards—136 systolic, 84 diastolic.

Physical examination was negative except for generalized arteriosclerosis. X-ray studies of the gastrointestinal tract were normal.

A diagnosis of a small stroke was made.

#### *Case 3*

A 75-year-old lawyer was admitted to the hospital for the first time on November 18, 1943. He had been well until October, 1943, when, during an upper respiratory infection, he suddenly lost his appetite, became weak and tired, and had a complete change of personality overnight. He complained of a peculiar, "deathly sick feeling" in the epigastrium, which was present all the time. At first the peculiar feeling was relieved slightly by food, but as time went on he got no relief. He required sedatives for sleep, but still slept little. Whereas he had formerly loved to fish, go to the movies, listen to the radio, and play cards, none of these activities appealed to him after the stroke.

He had a history of chronic alcoholism, and had had a peptic ulcer, diagnosed by x-ray, two years previously. The stools were negative for blood. X-ray examination of the gastrointestinal system and the gallbladder was negative. The patient was discharged with the diagnosis of a silent stroke.

His second admission was on March 31, 1945, when he complained of a continuation of his former symptoms. By this time he could no longer remember lifelong friends, and had degenerated considerably. His memory was so bad that he could not remember what he had read in the newspaper from one minute to the next.

Another x-ray of the stomach and duodenum was normal. Various sedatives and antispasmodics were used, with only minimal relief. The patient suffered all the time, and finally committed suicide on May 10, 1945, about one and a half years after the stroke.

### *Case 4*

A 64-year-old woman was admitted to the hospital on May 1, 1945. She had been well until August, 1944, when she awoke one morning feeling weak and tired. She had not felt well since then. She had only a slight change in personality at that time, but she seemed to age a bit. Since then some neighbors had commented on the fact that she was "going downhill."

She entered the hospital because of weakness. Three weeks before admission she had a sudden onset of diarrhea, without blood or pus. For several days afterwards she experienced pain on eating. One week later she had an attack of influenza, with cough and anorexia. This lasted for a few days, and she had been weak since then.

She was known to have had hypertension for at least fifteen years, but her blood pressure had been lower during the three weeks before admission. She had lost between 15 and 20 pounds during this time. She had had thyrotoxicosis in 1933, which was relieved by thyroidectomy.

Physical examination was negative except for minimal arteriosclerotic changes in the retina and absent ankle jerks. Her blood pressure while she was in the hospital varied between 160 and 130 systolic, 100 and 70 diastolic. Urinalysis showed a faint trace of sugar, and the glucose tolerance test a diabetic type of curve. The basal metabolic rate was +10 per cent. A barium enema was negative, and x-ray examination of the chest showed "slight left ventricular hypertrophy, probably on an arteriosclerotic basis."

The diagnosis was a silent stroke in August, 1944, in addition to mild diabetes mellitus and post-influenzal asthenia. There was some question as to whether the episode of epigastric pain and diarrhea three weeks before admission had been due to another silent stroke.

### *Summary*

The "small unrecognized stroke" described previously by Alvarez has been discussed, and 4 illustrative cases reported. It has been pointed out that this condition, although it is often overlooked, is relatively common, and may usually be diagnosed from the history. The characteristic feature is the *sudden onset*, with one or more of the following symptoms: a change in personality, impairment of memory, emotional instability, gastrointestinal disturbances, unexplained loss of weight, and sudden aging. The prognosis is poor for return to the normal level, but good for life, and this fact is important in advising the patient and his family.

If the physician who is treating old persons will keep the small unrecognized stroke in mind, it will help him to explain many puzzling cases and will save many of his patients much unnecessary expense.

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**Only 85,000 of the 14,000,000 World War II veterans** had exhausted their entitlement to unemployment allowances by last Dec. 1, Veterans Administration said.

## INTESTINAL OBSTRUCTION

C. A. Woodard, M.D.
Wilson

The principal causes of intestinal obstruction are paralytic ileus, pressure from without the intestinal tract (tumors), adhesions, strangulation, atresia, growths in the bowel wall, strictures, foreign bodies (such as gallstones), indigestible masses of food, hernia, fecal masses, mesenteric thrombosis or embolism, volvulus, and intussusception.

*Paralytic ileus* is caused more by the action of the sympathetic nerves than by local toxins. Animal experiments have shown that inflamed segments of bowel respond to local stimulation almost as well as normal bowel. The use of spinal anesthesia will remove the inhibiting influence of the sympathetic nervous system, and permit the stimulant effect of the vagus nerve to move the gas.

*Tumors* and *strictures* of the bowel wall may be benign or malignant. Benign growths may be due to syphilis, gonorrhea, previous infarction, or trauma. Lymphogranuloma venereum may cause stricture of the rectum, and occasionally healing of ulcerative colitis may produce stricture of the colon. Malignant growths may produce obstruction by projecting into the bowel, or by constricting it.

*An inflamed gallbladder* may adhere to the bowel, and pressure from a large stone may cause a necrotic opening, permitting the stone to escape into the bowel and cause a blockage.

Perhaps the most frequent cause of intestinal obstruction in my experience is *strangulated hernia.* Less frequent and more difficult of diagnosis are *thrombosis* and *embolism* of the mesenteric vessels, causing gangrene of the corresponding segment of the bowel.

Obstruction may be caused by pressure from *inflammatory masses* in the pelvis, from *ovarian cysts,* or from *solid tumors.*

### *Pathologic Physiology*

The intestinal canal, from the pyloric end of the stomach to the ileocecal valve, normally contains swallowed air, digestive juices, and gases from the fermentation of

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From the Woodard-Herring Hospital, Wilson, N. C.
Read before the Section on Surgery, Medical Society of the State of North Carolina, Pinehurst, May 2, 1946.

food in the process of digestion. The normal advance of the contents is so rapid that the gases do not have time to separate out and collect in sufficient volume to show in an x-ray film. If the ileocecal valve is working, the contents of the small intestine pass into the colon. Normally they cannot get back, and in the presence of obstruction below, the colon becomes a closed tube which is increasingly distended.

### *Diagnosis*

The cardinal symptoms of intestinal obstruction are colic and vomiting, and these may be the only symptoms in the beginning. The pain is spasmodic, and is due to waves of peristalsis. The vomiting is at first reflex, and later becomes regurgitant and perhaps projectile. If the obstruction is in the colon, however, and the ileocecal valve is intact, there may be no vomiting. The pulse at first is not disturbed and the temperature is normal. The patient may have no tenderness or rigidity, and the distention may not develop until later.

The absence of early physical findings may divert one from the diagnosis. If there is no history of dietary indiscretion and no diarrhea, the symptoms of colic and vomiting should make one suspect obstruction. It should be kept in mind that, even in the presence of complete obstruction, enemas may produce expulsion of gas and fecal matter until the bowel below the obstruction has been emptied.

As the case progresses, the repeated vomiting produces dehydration. The imprisoned gas causes distention, the pulse quickens, and the patient develops an anxious look. After the bowel below the obstruction is emptied, there is no passage of gas or fecal matter, and the vomiting becomes fecal in type.

The presence of borborygmus may aid in the diagnosis. It is a gurgling sound and is synchronous with the colicky pain. If the distention is great, the sound is metallic in character. In cases of chronic intestinal obstruction, waves of peristalsis may be felt passing across the abdomen, and, in a good light, may be seen. This phenomenon is noted only after sufficient time has elapsed for the muscles of the intestinal wall to become hypertrophied, and is not observed in acute cases. Rigidity is not marked until the irritation of the peritoneum has had time to produce spasticity of the muscles of the abdominal wall.

If the lesion is due to a band and one end is attached to the parietal peritoneum, there may be point tenderness at the site of the attachment. If the obstruction is due to strangulation, the interference with the blood supply causes blood and serum to pass into the peritoneal cavity, irritating the peritoneum and producing tenderness. In cases of intussusception, a sausage-shaped or globular tumor may sometimes be palpated. In cases of malignancy advanced to the point of causing obstruction, a mass is usually to be felt.

#### *X-ray findings*

If the case is of the paralytic type, the gas may be distributed throughout the small and large intestine. If the condition is of the obstructive type, the gas is seen only above the obstruction. In cases of small bowel obstruction, gas is centrally disposed and the x-ray markings are transverse, showing the so-called "step-ladder" effect. If the colon is obstructed, the gas is seen at the sides.

### *Treatment*

The treatment of intestinal obstruction may be conservative or operative. In the absence of tenderness, which is the most suggestive sign of strangulation, it is practicable to try conservative measures—decompression of the bowel and maintenance of the electrolyte and fluid balance of the body.

Decompression may be accomplished by the introduction of a tube into the bowel through the nose. The Miller-Abbott double lumen, balloon-type tube, or the Levine tube with the Wangensteen apparatus may be used. Our experience has been limited to the latter, which we have found to be satisfactory. It consists of two bottles, a duodenal tube containing numerous perforations for a distance up from the leaded tip, a Y-shaped connecting tube between the duodenal tube and the upper bottle, and a glass tube extending from the proximal tube through the perforated stopper into the upper bottle. Water in the upper bottle drains through a tube into the lower one, creating a partial vacuum. When the apparatus is working, the patient is allowed to drink water freely. Some of it is absorbed, but most of it is siphoned into the bottle, bringing gas and gastric and intestinal contents with it. The distention is thus reduced and much of the highly toxic and infectious material is evacuated.

Patients as a rule feel better in a few minutes. The nasal tube is not so uncomfortable as it seems, and most patients bear it with a degree of grace because of the relief it affords. Some protest to the point of forcing its discontinuance, but in suitable cases it gives dramatic results. The relief is not merely symptomatic, for in many cases the patient has no further symptoms and goes on to recovery.

In cases of strangulation, mesenteric thrombosis, or complete blockage from malignant growths, constricting bands, volvulus, and the like, surgical interference becomes necessary, but pre-operative use of the suction apparatus reduces the distention, improves the condition of the patient, and makes the operation less hazardous. The wise surgeon recognizes the limitations of this method and proceeds without undue delay to perform the surgical procedure indicated.

### *Case Report*

A female patient, aged 38, had an abdominal hysterectomy for fibroid tumor. Two months after the operation she was taken suddenly with nausea, vomiting, and intense spasmodic abdominal pain. She was brought to the hospital promptly. There was no tenderness or rigidity, but some distention was present. Her temperature and pulse were normal.

An enema was given, and a fair amount of gas and fecal matter was evacuated. Her stomach was washed out, and she felt a good deal of relief temporarily. The vomiting and pain soon started up again, however. Another enema was given, and some gas and fecal matter were again obtained. The use of a Wangensteen suction apparatus reduced the distention and gave the patient some relief, but the colicky pain shortly recurred.

By this time a definite diagnosis of intestinal obstruction was made and operation was advised. The family refused consent at first, but finally agreed to an operation, which was performed seven days after the beginning of the attack. A cord-like adhesive band was found constricting the small intestine about its middle. So tight was the constriction that pressure necrosis had virtually divided the intestine, and it came apart on being lifted up without traction. The peritoneal cavity was badly soiled.

The necrosed ends of intestine were trimmed away, and the openings closed. A side-to-side anastomosis was established. Sulfanilamide was instilled, and the wound was closed without drainage. Penicillin was administered intramuscularly. Five blood transfusions were given—one before and four after the operation. Glucose in Ringer's solution was used liberally throughout until adequate nourishment could be taken by mouth.

The convalescence was relatively easy, except for the development of a small abscess in the abdominal wall near the wound. This was incised, and healed promptly. From then on recovery was uneventful.

### *Discussion of Case*

Attention is directed to the following points in this report:

1. The obstruction did not appear to become complete for several days, since some gas and fecal matter were obtained by enemas given during this time.

2. The deceptive periods of relief between the episodes of vomiting and colic made it difficult to arrive at the decision that surgery was indicated.

3. Our impression was that the penicillin was an important factor in this patient's recovery.

### *Conclusion*

When a patient has an attack of colic, perhaps with vomiting, that can not be accounted for otherwise, intestinal obstruction should be considered. Once a diagnosis of intestinal obstruction is made, prompt surgical intervention should be urged. Early operation is attended with little risk, whereas undue delay multiplies the hazard.

### *Discussion*

**Dr. Foy Roberson (Durham):** In his usual thorough-going way Dr. Woodard has covered the subject of intestinal obstruction in such a fashion that there is little one can add.

Intestinal obstruction, if neglected, is still a deadly condition; but under modern methods of diagnosis and treatment it is not seen as often as formerly, nor is the morbidity or mortality as great. No longer are patients allowed to remain at home until they are in a serious condition, and then rushed to the hospital for an emergency operation. The alert medical man, the well trained house doctor, the nurse, and even the laity usually recognize abdominal pain as a significant warning of danger ahead, and seek surgical consultation. The patient can then be treated by decompression and maintenance of fluid balance, and prepared for whatever surgical procedure seems appropriate.

**Dr. H. Max Schiebel (Durham):** In the past two years we have seen 4 patients with malignancy of the large bowel who had as their first presenting symptom an acute intestinal obstruction. Three of the patients were young—one 17, one 26, and one 29—, while the other was in the early sixties. No mass could be felt in these patients, and we thought that a small lesion must have ulcerated, causing sudden edema, with resultant obstruction.

With the Miller-Abbott tube or some other means of obtaining decompression, patients with intestinal obstruction can be prepared for surgery so that the whole lesion can be resected at the first operation.

I would like to cite as a warning one case which I saw in consultation. This patient had been operated upon several times in other hospitals for acute or chronic intestinal obstruction, and when he came to our hospital with obstructive symptoms we were loath to repeat an operative procedure. He was treated with a Miller-Abbott tube with suction, and recovered from the obstruction. He went home without further study, but returned in about eight months with another bowel obstruction and had to be operated on. A malignancy of the transverse colon had developed sometime between the early operative procedures and the last one, and was already inoperable. This case shows the importance of having a gastrointestinal study made on every patient with obstructive symptoms before he leaves the hospital.

## Maternal Welfare Section*

### ECLAMPSIA

The last two maternal welfare articles have pointed out the gravity of the problem of toxemia of pregnancy in North Carolina. One third of the maternal deaths in our state result directly from the hypertensive complications of pregnancy. Many additional deaths occur as a result of other complications which are directly related to toxemia, such as abruptio placentae, cardiac failure, and others.

Eclampsia constitutes a major obstetric hazard. It is defined as convulsions or coma in a patient presenting hypertension, albuminuria, or edema.

#### *Prognosis*

The prognosis in eclampsia is always serious. It varies considerably, depending upon (1) the severity of the disease, (2) the time of occurrence of convulsions in relation to the duration of pregnancy and labor, (3) the underlying pathology, and (4) the method of management.

According to Dieckmann, eclampsia is to be considered severe if one or more of the following findings is noted: (1) more than ten convulsions, (2) coma, (3) fever, (4) pulse rate over 120 per minute, (5) respiratory rate over 40 per minute, (6) cardiovascular impairment, and (7) failure to respond to treatment.

The appearance of eclampsia early in pregnancy is an ominous sign. The management of antepartum eclampsia presents the greatest hazard because the problem of delivery is added to the specialized medical problem of the management of the convulsive state. For this reason, intrapartum and postpartum eclampsia have a more favorable prognosis.

The preceding articles have pointed out that convulsions and coma resulting from nephritis complicated by pregnancy may appear identical to convulsions in the course of progressive, severe preeclampsia. The differential diagnosis of the basic pathologic lesion often depends primarily on the history. Occasionally an accurate diagnosis must wait until the patient is observed *post partum*. The essential points of accurate differential diagnosis were covered in the preceding articles on toxemia of pregnancy.

#### *Management*

The convulsive stage of eclampsia is characterized clinically by convulsive seizures, by hyperirritability alternating with coma, and by stupor and disorientation. Radical treatment to terminate pregnancy immediately is now universally condemned. Cesarean section is associated with a prohibitive mortality and has been discarded. Eclampsia cannot be treated in the home without unnecessary loss of life. It is essential that the patient have the constant supervision and therapeutic regimen which can be provided only in a hospital. Any convulsive or comatose patient seen in the home should be given morphine sulfate, grain ¼, and another dose of ⅛ to ¼ grain if convulsions are not controlled in fifteen to thirty minutes. The patient should then be transported to the nearest available hospital. A record of the medication given should invariably accompany the patient if she is referred to another physician for additional care.

#### *Sedation*

A careful evaluation of the patient and of her reaction to the initial sedative drug is important in the selection of additional sedative agents. The amount of sedatives given should be just enough to *terminate convulsions, prevent their recurrence, and control extreme restlessness and irritability.* Barbiturates are the drugs of choice to provide the complete rest necessary for proper management of this condition. If sodium phenobarbital is used, an initial subcutaneous dose of 5 grains should be given, followed by doses of 2 to 5 grains repeated as often as necessary to control restlessness.

Sodium amytal or sodium pentobarbital, 2 to 6 grains, may be given intravenously instead. These drugs must be given slowly —not more than 1 cc. of solution per minute.

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*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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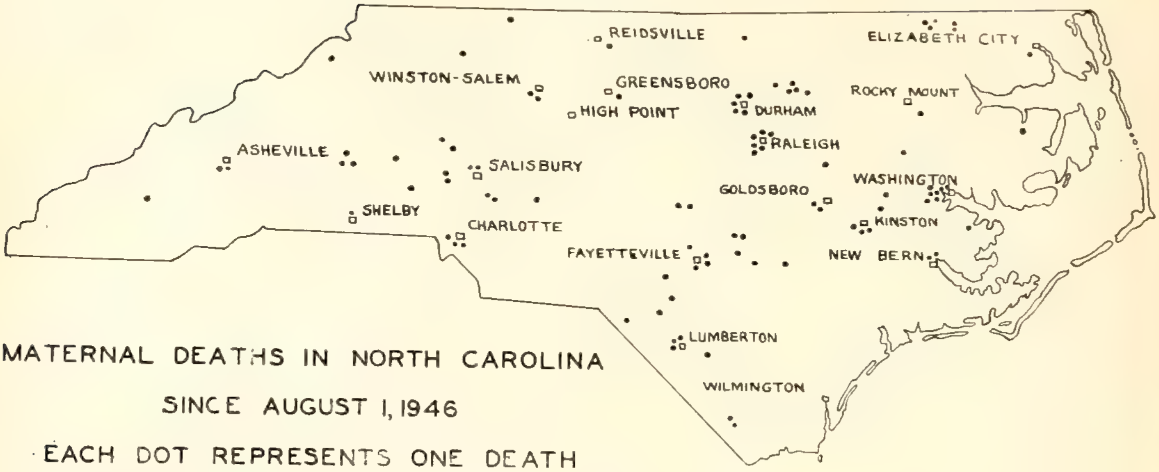

MATERNAL DEATHS IN NORTH CAROLINA SINCE AUGUST 1, 1946

EACH DOT REPRESENTS ONE DEATH

The administration of the intravenous solution is stopped when the patient begins to sleep and when all restlessness disappears. The dose is determined by the amount required to produce sleep. A state of quiet rest can be maintained by the periodic administration of 3 to 6 grains of the drug selected by mouth or by rectum. The dose should be regulated so that the patient sleeps quietly when undisturbed but can be awakened to take fluids by mouth after the convulsions are fully controlled. A profound drug stupor is undesirable. Anoxia and acidosis are aggravated by the diminished respiratory activity, and the urinary output is apt to be further decreased.

*Accessory drugs*

Magnesium sulfate solution is of value in severe cases. It supplements the sedative drugs in the control of extreme irritability. Twenty cubic centimeters of 10 per cent magnesium sulfate solution should be injected slowly by vein in severe cases, or into the muscle when less urgent need is present. The dose should not be repeated unless convulsions recur or unless restlessness and irritability persist in spite of sedation. Calcium gluconate should be readily available, and 15 grains are given intravenously at once if serious respiratory depression or other unfavorable reaction follows the administration of the magnesium sulfate solution.

Fluid and glucose in distilled water should be used, and saline solution should be scrupulously avoided. No solution containing sodium should be administered, since sodium ion retention is a primary factor in the edema and oliguria which are present. The quantity and concentration of the dextrose solution given to the patient are determined by the clinical picture and by the hourly record of the fluid intake and output. If a patient has evidence of cardiac failure or pulmonary edema, smaller amounts of concentrated dextrose solution are preferred to promote diuresis. Fifty to 100 cc. of 50 per cent dextrose solution should be given very slowly, and the patient should be carefully observed for further evidence of cardiac failure; this treatment is repeated at intervals of four to six hours, depending upon the patient's reaction. Hydration with 1,000 to 1,500 cc. of 5 per cent glucose in sterile water, given three or four times in a twenty-four hour period (total 3,000 to 5,000 cc.) is preferred for a patient with adequate cardiac compensation. Evidence of dehydration, which may be present in spite of edema, calls for large quantities of less concentrated solution. The injudicious use of large quantities of fluid, however, may result in cardiac embarrassment and acute pulmonary edema, and may aggravate the impaired renal function already present.

The intravenous administration of fluid should be discontinued when adequate oral fluid intake is possible. Fluids given by mouth should be high in protein and low in salt content. It should be remembered that milk is a solution containing 1½ Gm. of salt in 1,000 cc. and is undesirable for the toxemic patient. As much salt as possible should be eliminated from the diet.

The continuous administration of oxygen is of particular value for a patient who is cyanotic or exhibits respiratory or circulatory embarrassment.

*General measures*

Eclamptic patients require absolute quiet; all unnecessary external stimuli should be scrupulously avoided. The patient should be put to bed in a darkened room and all examinations and treatment deferred until the sedation has become effective.

The patient must be protected against falls or other injuries by constant supervision and by side guards on the bed. Forcible restraints should never be used. A mouth gag should be inserted, if necessary, to avoid injury to the tongue.

The head of the bed is elevated to promote easy breathing, and suction should be used frequently to remove blood, mucus, and fluid.

The constant direction of an experienced physician is essential to the success of treatment. Designation of responsibility to nurses or to inexperienced hospital personnel results in unnecessary fatalities.

*Termination of pregnancy*

It has been pointed out that radical measures to terminate the pregnancy immediately are associated with a very high mortality rate. It should also be noted that the common practice of inducing labor by methods which are traumatic and irritating to the patient, as soon as convulsions are apparently controlled, is almost equally bad. *"Haste makes waste."* It is far better to wait for a period of time after the convulsions are controlled and until the patient is considerably improved before attempting to terminate pregnancy. In most instances a prompt response to treatment is noted; in some, a period of several days may ensue before the blood pressure has returned to normal or near normal levels and the amount of albumin in the urine begins to decrease.

Labor should be induced by the simplest possible method and with the least possible trauma to the mother and child. The tendency to a spontaneous onset of labor in toxemia increases the probability of success with methods of medical induction. The use of a standard medical induction repeated several times is preferred to more radical methods. Each attempt at medical induction increases the chance that the next one will be successful.

If medical induction fails, simple rupture of the membranes is the most acceptable method of induction, when conditions are suitable for its use. The cervix should be partly dilated and effaced, the presentation longitudinal, preferably vertex; engagement must be present. Methods of induction will be discussed further in next month's article.

When convulsions occur earlier in pregnancy and a long, closed cervix is present, expert judgment is necessary. Often a cervix will change remarkably under the influence of several attempts at medical induction.

Cesarean section or hysterotomy should rarely be considered. These methods are indicated only when a long, firm, closed cervix in a nullipara, or other obstetric conditions preclude vaginal delivery.

Sedation and active treatment must be continued for a minimum of three full days after the patient has apparently returned to normal; undelivered patients should be kept under constant observation and treatment until three days after delivery. A fatal recurrence of convulsions is possible if treatment is abruptly withdrawn. Each patient must be carefully evaluated before another pregnancy is attempted. In many instances residual kidney damage is present, indicating that a basic renal lesion was the cause of eclampsia.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

Josiah C. Trent, *Editor*, M.D., F.A.C.S.

Durham

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## II

## SAMUEL BARD, 1742-1821

Although many medical practitioners of colonial America gave attention to the problems of obstetric science, it was long before obstetrics was accepted as a dignified and respectable branch of medical practice. As late as 1791, an established physician like Benjamin Rush could complain bitterly when a woman he was called to attend in a "fitt of colic" was found to be in labor. No midwife was forthcoming, so he made "a virtue of necessity" and gave his assistance, but most reluctantly: "My feeble constitution—

my Other extensive engagements—& my inclinations all revolt against practicing midwifery."(1)

Fortunately for the future of obstetrics, Rush's repugnance was not shared by some of his most distinguished contemporaries. One of his colleagues in Philadelphia, William Shippen, began in 1762 to give a course of lectures on obstetrics, numbering among his pupils professional midwives as well as medical students. John V. B. Tennent began a similar work in New York at about the same date; he was appointed in 1767 to the first professorship devoted to obstetrics alone, a chair in the newly established New York Medical School. From 1850 on, in Boston, James Lloyd made a specialty of obstetrics and trained many able pupils in the science. These pupils carried their knowledge and enthusiasm throughout the colonies, while still other American medical students, having acquired obstetric lore during their studies abroad, came home well equipped to increase the prestige of the neglected science. Samuel Bard was one of these, and one who made a notable contribution to the progress of obstetrics in America.

Born in Philadelphia in 1742, Bard was the son of Dr. John Bard (1716-1799), who achieved considerable distinction in his profession. He was the first American physician to report a case of extra-uterine pregnancy (1759), and the first to take part in systematic dissection for purposes of instruction (1750). He was the intimate friend and lifelong correspondent of Benjamin Franklin, who, in 1746, induced him to remove from Philadelphia to New York to take the place of two New York doctors who had died of yellow fever. In New York, therefore, young Samuel Bard received his early education, entering King's College at the age of 14. In 1760, his father sent him abroad to study medicine, but the ship on which he sailed was captured by a French privateer, and Bard lay captive for five months at Bayonne, his release being secured at last by Franklin. He then proceeded to London, where he served for a time as an assistant in St. Thomas' Hospital. Thence he went to Edinburgh and applied himself to medical studies there, graduating with the M.D. degree in 1765. The subject of his graduation thesis was "De viribus opii."

After a further ten months of study and observation in London clinics, Bard returned to New York and entered practice. He soon became a busy and uncommonly popular physician. An active mover in the organization of the New York Medical School, he became the first professor of the theory and practice of physic. His flourishing career met with a serious interruption, however, at the outbreak of the Revolution. Bard and his father maintained their loyalty to Britain and found it impossible, as Tories, to continue their professional lives. The father retired to his farm at Hyde Park, and the son went for a time to Shrewsbury, New Jersey, where he unsuccessfully attempted to establish a salt manufactory. When the British took New York, Samuel returned and resumed his practice, countenanced and assisted by eminent citizens who respected his ability and integrity. Later, when the American government was established in the city, Washington paid tribute to the same qualities by making Bard his family physician.

For nearly twenty years thereafter Bard carried on his work in New York, retaining his position as professor of physic when in 1792 the New York Medical School became a part of Columbia College; he was at this time appointed dean of the faculty of physic. He was instrumental in the founding of the New York dispensatory and of the city library. He became a visiting physician at the New York Hospital on its opening in 1791, and there devoted much time to obstetrics. In 1795 he took David Hosack into partnership with him and three years later retired to Hyde Park, only to return to New York after a short period to assist in fighting a severe epidemic of yellow fever. He contracted the disease himself, in so severe a form as to impair his health and prevent his again engaging in active practice. The remainder of his life was spent in retirement, but his interest in medical matters had suffered no eclipse, for it was in the years of quiet from 1798 onward that he conceived and prepared his classic work on obstetrics.

Published in 1807, with a cumbersome title (fig. 1) and a modest introduction, Bard's COMPENDIUM OF THE THEORY AND PRACTICE OF MIDWIFERY was immediately

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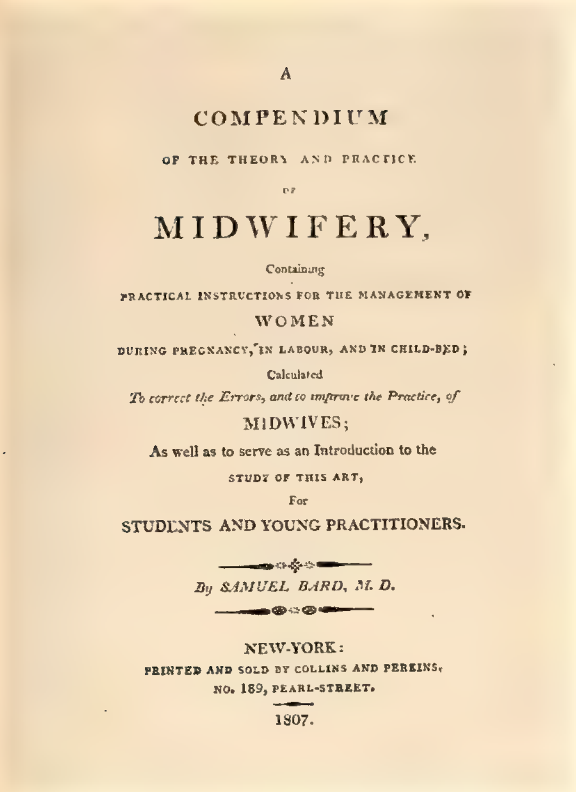
1. B. Rush to Mrs. Rush, August 24, 1791; autograph letter in the author's collection.



A

COMPENDIUM

OF THE THEORY AND PRACTICE

OF

MIDWIFERY,

Containing

PRACTICAL INSTRUCTIONS FOR THE MANAGEMENT OF

WOMEN

DURING PREGNANCY, IN LABOUR, AND IN CHILD-BED;

Calculated

*To correct the Errors, and to improve the Practice, of*

MIDWIVES;

As well as to serve as an Introduction to the

STUDY OF THIS ART,

For

STUDENTS AND YOUNG PRACTITIONERS.

*By SAMUEL BARD, M. D.*

NEW-YORK:

PRINTED AND SOLD BY COLLINS AND PERKINS,

NO. 189, PEARL-STREET.

1807.

**Fig. 1. The crowded title-page of the first edition of Bard's obstetrical classic, published in New York City in 1807. (From the author's collection)**

popular. It went into three large editions, then, in an extended form, into two more. The author claimed but little for his work, describing it as "a concise, cheap book, containing a set of plain but correct directions for [the] practice in natural labours, and for the relief of such complaints as frequently accompany pregnancy and labour, or which follow after delivery."(2) He deserved far more credit than he sought, for his "plain directions" are enriched with compound interest in sterling common sense. Not the worst illustration of this statement is the fact that at the very outset, in introducing his book, Bard exhorts his readers not to trust wholly to books in acquiring a knowledge of midwifery, but to seek instruction and experience under established professors of the science.

A few passages from the COMPENDIUM will serve to show the wise and judicious tone of the whole. In discussing difficult labors, Bard remarked:

"A sedentary life and luxurious education, are the chief causes of all the evils which women suffer during pregnancy and labour. Keep children, therefore, out of doors, in constant exercise; allow them a full but plain and simple diet; and when grown up to be young women, let them live more agreeably to nature; let them avoid late hours and crowded rooms, indulgence in soft beds, and luxurious diet; let them walk, ride, and dance. And let them extend something like the same discipline to their minds and tempers; avoid all irritability of disposition, all affected delicacy and timidity; and in their place, cultivate calm and steady minds, and they will probably insure to themselves safe and easy labours."

(pp. 142-143)

He was reluctant to discuss the use of instruments and did not incorporate a section on this subject until the publication of the fourth edition. Repeatedly he warns his readers against any precipitate interference with the normal course of labor:

"Convinced that the use of instruments, and the introduction of the hand into the womb, as too frequently employed by the unskilful, is more desperate than the most desperate case of labour left to nature; it has been my wish to avoid, as much as possible, even mentioning these operations: still I have thought it necessary to describe the treatment of some lingering and difficult labours, and even of some preternatural cases; in all which, although I constantly advise the midwife to call for assistance, yet, (especially in the country) as what is better than her own is not always at hand; and much important time may be lost before it can be procured; the midwife ought to be instructed how to employ the interval to advantage."

(p. 4)

"Having greatly improved the instruments of his day, [Smellie] has described their use with great precision; and I own I am apprehensive that many of his readers may thereby be induced to suppose them equally safe in their hands, as they appear to have been in his—and hence be led to a more frequent use of them than modern practice has found necessary or safe."

(pp. 8-9)

"But the introduction of the hand into the womb, especially under circumstances of such alarm and terror as frequently accompany these cases, is an operation which requires great skill, joined to calm reflection, and steady resolution; and should never be attempted but by persons whose knowledge, experience, and fortitude qualify them for so arduous a task."

(p. 154)

Bard's COMPENDIUM is marked from first to last by a quality not too common in his time; the author is content to present the results of his long experience and observation in a plain and carefully outlined form, without building thereon an airy structure of theory. His purpose was to teach, and to this purpose he subordinated his own extensive learning. One cannot examine this little volume without becoming convinced of its fitness and great value as a means of instruction.

—J. C. T.

2. Bard, Samuel: A Compendium of the Theory and Practice of Midwifery, New York, Collins & Perkins, 1807, p. [3].

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FEBRUARY, 1947

## STATE MEDICAL SOCIETY TO MEET AT VIRGINIA BEACH

For the first time in its history, the Medical Society of the State of North Carolina will be forced to hold its annual meeting outside the state. It is true that in 1937 the meeting was held during a cruise to Bermuda; but this plan was followed from choice and not from necessity.

At its record-breaking meeting last year, the Society voted to return to Pinehurst in 1947. After the meeting was over, however, the manager of the Carolina Hotel notified Secretary McMillan that he could not permit the Society to meet there in 1947. After this, Dr. McMillan did all that was humanly possible to find some other place in the state that had the hotel facilities necessary to accommodate the Society. He thought the problem was solved when the manager of the Robert E. Lee Hotel in Winston-Salem promised to arrange accommodations for 400 to 500 people. It was thought that, with so many populous cities within commuting distance, this number of beds would be sufficient.

Shortly after February 1 Mr. Frank L. Swadley, the new manager of the Hotel Robert E. Lee, had to admit that he could not promise to take more than 150 to 200 guests, and that the other hotels in the city could not accommodate more than 100, at the most. A letter from Mr. Swadley in the Correspondence Section explains the position of the hotel.

Since no other place in the state has made any better offer than Winston-Salem, Secretary McMillan was forced to find accommodations outside the state. The manager of the Cavalier Hotel at Virginia Beach has promised to find sufficient hotel rooms for the meeting, at the Cavalier and at some of the nearby hotels. Applications for rooms should be sent at once to the manager of the Cavalier Hotel, Virginia Beach, Virginia.

It was necessary to change the date of the meeting from April 28, 29, and 30 to May 12, 13, and 14. The hotel is being reserved for the exclusive use of the Society from Sunday, May 11, through Wednesday, May 14.

Let us hope that within the near future some of our cities will increase their hotel facilities, so that it will not be necessary for the Medical Society of the State of North Carolina to leave the state for its annual meeting.

* * * *

## "THEIR MOTHERS' SONS"

To those who were brought up to think that the act of giving birth to a child automatically endows a woman with superhuman wisdom in rearing it, Dr. Strecker's book, THEIR MOTHERS' SONS(1), will come as a distinct shock. Most doctors, however, are prepared to accept his accusation that mothers are to a great degree responsible for the facts that 1,825,000 men were rejected for military service because of psychiatric disorders, that an additional 600,000 were discharged for neuropsychiatric reasons, and that a half million attempted to evade the draft.

Dr. Strecker makes a distinction between

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1. Strecker, E. A.: Their Mothers' Sons, Philadelphia, J. B. Lippincott Co., 1947.

"mothers" and "moms." The latter term is applied to the mothers who are too selfish or too emotionally immature to allow their offspring to become mature men (or women).

> "The future social behavior of a child has its beginning and is patterned in the conflicting sensations and emotions that arise from the early relationship between mother and child . . . If the give-and-take capacity is not developed, the child will fail to adjust himself to his own life and to society. As a result, the child never grows up. He remains emotionally immature. Weaning is as much a part of motherhood as is nursing."

The ways whereby "moms" keep their sons in bondage are many. Some do it by sheer domination; others by the martyr role, constantly reminding the son of the sacrifices Mother has made and is making for him. The martyr type is apt to use illness as a means of keeping her son close at hand. Others never relinquish the protective attitude. The various types of "moms," however, all accomplish the same end—that of keeping their son from ever attaining full maturity.

Dr. Strecker points out that the "moms" may wear pants, since some fathers are guilty of keeping their children dependent. There may also be grandmoms as well as moms.

Chapter 15 is the most devastating in the book. In it the blame for the large number of moms in America is placed on "the social system under which mom is allowed to flourish and flower." The most potent factor in the system, it is charged, is our educational system, "particularly progressive education." The lack of discipline, the encouragement of insubordination, labelled as "self-expression," and the elimination of wholesome competition, are all castigated by Dr. Strecker.

In contrast to "moms," mothers are given this distinguished service award by Dr. Strecker:

> "The mothers of men who fought valiantly and returned unharmed and the mothers of men who were seriously wounded—who had lost a leg or an arm and could joke about it, and those who were honorably "wounded" by severe combat and operational fatigue—need no decorations or citations to memorialize the service of their sons. They brought into the world sturdy flesh, blood, and sinew and activated it with the spirit of indomitable morale. That is enough. They are mothers of mature men—men who can and who are willing to meet life whether it be a civilian or a military life."

It is to be hoped that THEIR MOTHERS' SONS may be read by thousands of mothers, especially young mothers, and that its lesson may be learned by those who need it.

## TWO IMPORTANT QUESTIONNAIRES

Last November the Committee on National Emergency Medical Service mailed a questionnaire to more than 50,000 medical officers who served in World War II. This questionnaire was published, with editorial comment, in the *Journal of the American Medical Association* for November 23, 1946. The object of the questionnaire was to learn just what these men thought of the training they received, of the effectiveness with which their services were used, of the proportion of medical men in service as compared with those in civilian practice, and of the opportunities afforded medical officers to keep abreast of medical progress. It is hoped that the opinions thus received will be helpful in formulating plans for future medical emergencies, should they arise.

More recently another questionnaire has been sent to 5,000 physicians who remained in civilian practice, asking for their experiences during the war period, and giving them the opportunity to give their views on the conduct of future emergencies.

The great importance of both these questionnaires should be obvious. It is hoped that every man who received one will fill it out and return it as soon as possible.

* * * *

## OUR MOST VALUABLE EXCHANGE

The most recent medical journal added to the exchange list of the NORTH CAROLINA MEDICAL JOURNAL is literally the most valuable one. It is issued bi-monthly, and the annual subscription price is quoted at $2400; single issues cost $500 apiece. This subscription rate, however, is in Chinese currency; the price in United States money is considerably less—$5 per year, or $1 per copy.

The name of this extremely valuable publication is the *Chinese Medical Journal,* the official organ of the Chinese Medical Association. The first two issues for 1946, which have just been received, tell a story as thrilling as the first number of the *Hawaii Medical Journal* that appeared after the Pearl Harbor tragedy. Although the January-February number marks the beginning of volume 60, it is the first to be issued from Shanghai.

For four years before the United States entered the conflict, China and Japan were at war. In his foreword, Dr. James K. Shen, chairman of the Standing Committee of the Executive Board of the Chinese Medical Association, states that shortly after Pearl Harbor the *Chinese Medical Journal* "and its sister periodical, the National Medical Journal, which were then published at Peiping and Shanghai respectively, had to cease function, thus severing our only means of communication. We were faced with complete isolation from the rest of the world." In 1942, publication of these journals was resumed, under great difficulties. The *National Medical Journal* (printed in Chinese) was published in Chungking; two editions of the *Chinese Medical Journal* were published—one in Chengtu, the other in Washington. An editorial summary of the five-year hiatus in the regular activities of the Chinese Medical Association somewhat wistfully comments:

> "The beautifully printed Washington edition is indeed a pleasure to read, after several years of poring over periodicals printed with eight-point type on paper intended for humbler use in better days."

The account of the trials suffered in the Chengtu office is heart-rending to an editor:

> "Printing an English Medical Journal in the far interior of China is a hectic piece of labour. The rate of printing is one page a day. During the two weeks before Christmas and New Year, and especially before the Lunar New Year, the speed of printing was reduced to one page a week. Omissions and mistakes are numerous. Proof-reading is a trying task. The type-setters do not read English . . . At least every third night we have no electricity in Chengtu. Even when there is electricity, the light is hellishly dim especially before midnight."

Evidence of the hunger for medical knowledge that characterizes good medical men the world over is shown by this same editorial:

> "During the war, Dr. C. C. Chang had been instrumental in editing in Chungking, the Current Medical Selections consisting of articles selected from foreign journals and reprinted **in toto** or in part. Our fortunate confreres in Free China were thus kept in close touch with recent developments abroad. However, many of us, especially those in the more isolated centres and in the occupied areas, are still ignorant of much of the newer knowledge acquired during the war . . . The only copies of medical journals available here today are a few back numbers of leading American publications, which can be bought only at exorbitant prices on the clandestine market, and they all sell like hot cakes. Some of the numbers of the Journal of the American Medical Association used in preparing the abstracts in this issue cost from CN $2500-5000 (US $1.25-2.50) each. This being the situation in Shanghai, the plight of our members in the isolated areas can well be imagined."

To our medical colleagues in China who have been carrying on so bravely under such trying circumstances, the NORTH CAROLINA MEDICAL JOURNAL extends its greetings and best wishes, and its congratulations on the excellence of the reborn *Chinese Medical Journal.*

* * * *

## "GOOD-BYE TO THE GRAIN"

An editorial in the December issue of the *Journal of the Medical Society of New Jersey* will no doubt strike a responsive chord in the breasts of many practitioners—certainly of those beyond middle age.

> "Four centuries of medical history have ground to a stop with the decision that the grain and drachm must follow the apothecary's scruple into the oblivion of obsolescence. Already the Pharmacopeia Committee has reconstructed its conversion tables with the Gram (not the grain) as the point of orientation. The American Medical Association press has abandoned the apothecary's system even as an alternate notation. As new drugs appear on the market, only the metric dosage will be printed on the label. And the current crop of medical students are giving their patients four cubic centimeters of liquid medicine and glibly quote the dose of aspirin as three hundredths of a Gram.
>
> "At the risk of being called reactionary, we here enter for the record a modest word of protest. Perhaps some future antiquarian may recognize this as the last word ever spoken in defense of the apothecary's system. We insist that the grain is a more useful medical weight than the Gram or milligram. Most solid medications have a dosage on the order of 5 to 10 grains, the bromides, for instance, the chlorides, the sulfates, the salicylates, even the sulfa drugs. The corresponding metric dose is hard to remember and confusing to use: three tenths of a Gram or 300 milligrams. The potent alkaloids are dramatically pictured by their tiny fractions of a grain. Surely it is easier to remember and express the dose of atropine, for instance, as 1/100 of a grain than to say sixty-thousandths of a Gram. The grain is so comfortable a unit in medical posology that it must have been worked out by the apothecaries themselves precisely for that purpose. The Gram is rooted only in the empty notion of the weight of a mass of water in a cube a certain fraction of the earth's meridian on a side."

As long as forty years ago medical graduates were warned that they must learn to think in terms of the metric system, since to do so was riding the wave of the future. When the passing decades failed to bring about the proposed change, it began to seem that it might never take place. Apparently an irrevocable decision has now been reached, however. The NORTH CAROLINA MEDICAL JOURNAL agrees with the New Jersey editor in voicing a feeble protest against the passing of the grain. As his editorial concludes,

> "A Gram can be a Gram of anything. But the grain has always been used to denote the fine things of life—its valued jewels and potent medicines. The grain indeed refers only to precious stuff; a grain of gold perhaps, a grain of medicine, a grain of common sense."

# Clinicopathologic Conference

## Bowman Gray School of Medicine of Wake Forest College

The patient was a 47-year-old furniture worker who was admitted to the North Carolina Baptist Hospital for the first time on April 9, 1945, with chief complaints of nervousness and weakness of four weeks' duration. Five months prior to admission he fractured his leg and was sent to his local hospital, where he remained until about six weeks prior to admission. During this time he had a low-grade fever and complained of shortness of breath and nervousness. After he returned home his fever began to rise at night, and twice the rise in temperature was associated with chills. Two weeks before admission red spots appeared over the forearms and legs.

*Past history:* The patient had had poliomyelitis as a child, and for eight years prior to the present illness he had had dyspnea on exertion and palpitation.

*Physical examination:* The temperature was 103 F., the pulse 108, respiration 36, blood pressure 124 systolic, 70 diastolic. The patient was an obese, rather pale man, but did not appear to be acutely ill. The tonsils were hypertrophied, the teeth dirty and carious. The lungs were clear. The heart was markedly enlarged to the left; the rhythm was regular. Over the aortic area and extending down the left sternal border there was a grade 4 blowing diastolic murmur; a grade 4 systolic murmur was heard over the aortic area, and a grade 2 rough systolic murmur at the cardiac apex. The liver and spleen were not felt. A petechial rash was present over the feet, ankles, and both arms.

*Accessory clinical findings:* Aside from 3 to 4 white blood cells per high power field, the urinalysis was normal. The hemoglobin was 12.5 Gm., and there were 4,300,000 red blood cells. The corrected sedimentation rate was 38 mm. in an hour. The white blood cell count was 10,250, with 41 per cent segmented polymorphonuclears and 23 per cent non-segmented. The blood nonprotein nitrogen was 37 mg. per 100 cc. Total serum proteins were 5.9 Gm. per 100 cc. Blood chlorides were 564 mg. per 100 cc. The Kahn test and stool examination were negative.

An electrocardiogram showed left axis deviation and intraventricular block. The x-ray showed tremendous hypertrophy of the left ventricle of the heart, and bilateral pulmonary congestion. Repeated blood cultures yielded alpha hemolytic Streptococci, 20 to 30 colonies per cubic centimeter. *In vitro* tests showed these organisms to be completely inhibited by penicillin in a dilution of 1 unit per cubic centimeter.

*Course in the hospital:* The patient was given 20,000 units of penicillin intramuscularly every two hours, and within twenty-four hours the temperature was normal and the blood cultures were sterile. Ten days after penicillin was discontinued, however, his fever returned and the blood cultures again became positive. He was given penicillin again, with similar results, on two other occasions during this first admission. He was discharged from the hospital on July 17, 1945, with instructions to take a total of 4 Gm. of sulfadiazine per day.

*Subsequent admissions:* The patient was admitted to the hospital on three other occasions, each time with positive blood cultures, petechiae, chills, and fever. The physical findings in general were unchanged except for evidences of increasing cardiac failure and the finding of rather marked enlargement of the spleen. On the third admission the patient had lost about 40 pounds of weight. The laboratory studies yielded the following significant information: the urine showed 1 plus albumin, an average of 100 red blood cells per high power field, and numerous coarsely granular and red blood cell casts. The blood nonprotein nitrogen was 32 mg. per 100 cc. and the phenolsulfonphthalein excretion test showed 50 per cent total excretion in two hours. The urea clearance test was 13 per cent of the average normal. Blood cultures were again positive for alpha hemolytic Streptococci. Urine cultures were negative. Retrograde pyelograms showed suggestive, but not conclusive, evidence of pyelonephritis. During the third admission the patient was treated with penicillin for forty days, and all his remaining teeth were extracted. Following this therapy repeated blood cultures were negative, and the urine showed only 4-6 red blood cells and 4-6 white blood cells per high power field when the patient was discharged on December 12, 1945.

The patient took cold on the day after discharge, and was admitted to the hospital for the fourth time on January 1, 1946, with a temperature of 102.6 F. and albuminuria (3 plus). The throat culture revealed beta hemolytic streptococci, and the blood culture was again positive for alpha hemolytic Streptococci. Repeated *in vitro* tests showed complete inhibition of most of the alpha hemolytic Streptococci in 0.08 units of penicillin per cubic centimeter.

In spite of adequate doses of digitalis and diuretics, along with a sodium-free diet and penicillin, the evidences of cardiac failure were progressive and the patient finally lapsed into coma and died one hundred and twenty-eight days after his fourth admission.

During the four hospital admissions the patient received a total of 84,000,000 units of penicillin, for the most part intramuscularly, but on three occasions by constant intravenous drip. The largest total daily dose was 360,000 units.

### *Clinical Discussion*

DR. ROBERT L. MCMILLAN: The fundamental lesion in this case seems to have been subacute bacterial endocarditis due to the Streptococcus viridans. The patient exhibited aortic valvular heart disease (probably with mitral involvement), chills, fever, anemia, splenomegaly, petechiae, and blood cultures repeatedly positive for alpha hemolytic (green-producing) Streptococci. These facts establish the diagnosis. The possibility that the aortic valvular lesion was due to syphilis is rather remote; very few cases of bacterial endocarditis superimposed on syphilitic lesions of the aortic valve have been described(1).

Interest in this case centers on the fact that therapy failed, in spite of the fact that the infecting organisms were quite sensitive to penicillin, as was demonstrated by repeated *in vitro* studies. It is very likely that there was a focus harboring Streptococci viridans which was never eliminated by the penicillin. The teeth have long been recognized as such a focus, and improvement followed the removal of all this patient's teeth—wisely done while he was receiving penicillin. Tonsillar infection was present and was a possible source of trouble. There were no other demonstrable external lesions, and one must therefore consider the possibility of some lesion within the circulatory system. Buried collections of bacteria have been found in the subendocardium of patients with apparently healed bacterial endocarditis, who have died of heart failure or from some other cause. In this patient, however, the promptness with which the blood cultures became positive after omission of penicillin suggests the possibility of a mycotic aneurysm. In one patient treated here such a lesion occurred in the popliteal artery, and following its excision the blood cultures became sterile.

Treatment of subacute bacterial endocarditis may fail when the daily dose of penicillin is too small, or when therapy is not continued over a long enough period. The required dosage of penicillin varies from case to case(1), but errors are undoubtedly made in many cases by giving too little of the drug. In the absence of sensitivity on the part of the patient, there is apparently no such thing as overdosage. The necessity of giving ample amounts of penicillin over a long period of time has been pointed out by various authors(1,2). Higher blood levels may be obtained with massive doses(3). Since this patient's blood cultures were promptly rendered sterile by penicillin, it seems that the daily dose must have been adequate. Early in the disease, the duration of treatment may have been too short.

The most likely explanation of the therapeutic failure in this case, however, is the existence of a "feeder lesion," such as a mycotic aneurysm infected by Streptococcus viridans and inadequately affected by the penicillin.

On the last admission a new and probably significant finding was described. Beta hemolytic Streptococci were found by throat culture. Urinary abnormalities were greater, and progression in the cardiac failure was evident. Acute rheumatic myocarditis is not an uncommon finding in patients with rheumatic endocarditis who are in cardiac failure. The possibility of acute glomerulonephritis is also not unlikely. Both of these lesions may occur as hypersensitivity reactions to a beta hemolytic streptococcal infection, such as this patient had in the throat.

1. McMillan, Robert L. and Wilbur, E. L.: Staphylococcic Endocarditis Superimposed on Syphilitic Aortic Endocarditis, J.A.M.A. 109:1194-1195 (Oct. 9) 1937.
2. McMillan, Robert L.: Subacute (Streptococcus Viridans) Endocarditis Treated with Penicillin, Am. J. Med. 1:628-633 (Dec.) 1946.
3. Hunter, Thomas H.: The Treatment of Subacute Bacterial Endocarditis with Antibiotics, Am. J. Med. 1:83-92 (July) 1946.

*Dr. McMillan's diagnoses*

1. Subacute bacterial endocarditis due to Streptococcus viridans.
2. Old rheumatic heart disease, with aortic regurgitation and probably mitral valvulitis.
3. Mycotic aneurysm.
4. Congestive heart failure.
5. Glomerulonephritis and embolic nephritis.
6. Splenic, renal, and probably cerebral emboli with multiple infarctions.

### *Anatomic Discussion*

Dr. Robert P. Morehead: The heart weighed 700 Gm., and there was marked hypertrophy of the left ventricle. The mitral valve was slightly thickened, and suggested an inactive rheumatic process. In the aortic valve, however, marked pathologic changes were encountered. The cusps of this valve were greatly thickened and covered with friable vegetations, which varied greatly in size and position. The first portion of the aorta was greatly dilated, and numerous atherosclerotic plaques could be seen on the surface. The spleen was decidedly enlarged, weighing 635 Gm., and numerous infarcts showing various stages of organization were present. In the kidneys also were circumscribed areas which for the most part represented healed infarcts. All organs were congested.

Microscopic examination revealed the usual changes encountered in the hearts of patients dying of bacterial endocarditis superimposed on rheumatic heart disease. In the aorta there was considerable mononuclear infiltration, which tended to be perivascular in distribution. Hyalinized glomerular loops of the type encountered in focal embolic glomerulonephritis were present in the kidneys. Capsular proliferation of the type encountered in subacute glomerulonephritis was also seen.

In summary, we can state that this patient suffered from bacterial endocarditis superimposed on rheumatic heart disease. As a result of embolic phenomena, infarcts were produced in the kidneys and in the spleen. It is difficult to say with any degree of certainty just what was the etiology of the aortitis. It is well known, however, that syphilis is the most common cause of aortitis in this area.

The value of penicillin in bacterial endocarditis is well established. I am of the opinion, however, that it is impossible to say that patients have been completely or permanently cured by this form of therapy. Considerably more time will be required to differentiate arrests from cures following therapy in this disease.

*Anatomic diagnoses*

Rheumatic valvulitis (aortic and mitral)
Vegetative endocarditis
Chronic aortitis with aneurysm formation
Infarctions of the spleen
Infarctions of the kidney
Focal embolic glomerulonephritis
Subacute glomerulonephritis
Chronic passive congestion of the viscera

## MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

**Workman's Compensation:** *Total disability does not mean a state of absolute helplessness.*

The question of what constitutes total disability occurs quite frequently in the practice of medicine, both in relation to insurance policies and in connection with compensation cases. There appears to be no reason why standards accepted by judicial tribunals should not be acceptable to insurance carriers.

In the case at hand a 66-year-old employee of a feed mill became entangled in an automatic elevator. The elevator carried him to the second floor of the plant, where his lower extremities were caught between the floor and the gate of the elevator. One of the bones of the left leg was fractured six inches above the ankle, and considerable trauma was done to the soft tissues of the right thigh. He spent a long period of time in a hospital. When he was allowed to return to work his condition made it impossible for him to work more than two weeks at a time. Eventually his health forced him to resign in order to seek less strenuous employment. He then attempted to perform light duties at a munitions plant and also at a meat packing establishment, but with little success.

After receiving $15.00 per week for a period of sixteen weeks and three days, the injured man petitioned the compensation commission for further benefits, alleging non-recovery. The commission denied the plaintiff's request. He appealed to the superior court, where the judgment of the commission was upheld.

The cause finally came up for hearing upon appeal to the Supreme Court. This tribunal discussed certain facts interesting and instructive from a medical point of view. Total disability, the court stated, contemplates the loss of earning power, and in measuring such loss consideration should be given to the ability to earn wages, eligibility to procure employment generally, ability to hold a job, and capacity to perform the tasks of the work in which the person is engaged. The disability must of course be due solely to the accident or injury complained of, and not the result of other bodily infirmities. (It was urged, but not proved in this case, that the claimant's disability was due to a metabolic disorder incident to his age.) Continuing, the court warned that in the determination of total disability a claimant should not be penalized because of the fact that he attempted to return to work while he was still weak and suffering from the effects of the accident. (The defendant had contended that the injured man's attempt to return to work showed that he was not totally incapacitated.)

The decision reached in this case lays down the rule that total disability does not mean a state of absolute helplessness, but includes more than partial incapacitation, and means disability of an employee to earn wages in the same kind of work that he has been trained for or is accustomed to perform, or work of a similar nature, or any other kind of work which a person of his mentality and attainments could do.

The principles and standards set forth in the discussions concerning this suit should be helpful to physicians in arriving at a conscientious determination of total disability. In the present instance the decision was reversed and the case remanded for proper entry of the judgment in favor of the claimant. (V. 23 N. W. 2nd Series 262, Supreme Court of Nebraska.)

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**Veterans Administration is operating 123 hospitals now**, but it eventually expects to have more than 200 in order to handle the anticipated load of veteran-patients.

Veterans who served in the armed forces during peace time are entitled to Veterans Administration hospital benefits only if they have service-connected disabilities.

# TUBERCULOSIS ABSTRACTS

## *A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol XX February, 1947 No. 2

CHEST films of thousands of persons have shown lesions suggestive of early tuberculosis. Even though a fair percentage of these persons have had no tuberculin tests performed, no sputum examined, and no history of symptoms taken to confirm or deny the suspicious film findings, many of them have been labeled as tuberculous. This is scientifically unsound, and we should now take stock of our diagnostic criteria for the clinical determination of early tuberculosis.

### WHAT IS EARLY TUBERCULOSIS?

Millions of people in the United States have been examined by means of mass radiography since the early days of World War II. This new technique is rapidly achieving the long-sought goal of X-ray examinations of the lungs of the majority of adults in our country. This objective can easily be reached within five years if all our resources are mobilized and a national plan is executed with speed and efficiency.

Yet a word of caution must be given to prevent indiscriminate diagnoses of pulmonary tuberculosis on the basis of X-ray examination alone.

Specialists in tuberculosis rightly insist that, before final diagnosis, every attempt be made to obtain sputum specimens, and that such specimens be submitted to meticulous examination by direct smear of actual or concentrated sputum and, if this be negative, by culture or guinea pig inoculation. If sputum is not present, a stomach washing should be made and the contents examined by appropriate culture methods in laboratories that employ skilled bacteriologists. In cases of pleural effusion, the same procedure should be followed. This is possible only in an accredited laboratory which has been certified by some impartial central laboratory.

If, after such diligent search, no tubercle bacilli are found, the diagnosis should be limited to "suspected tuberculosis." This does not mean that many of the shadows found on the survey films are not the residue of a tuberculous process that once was active. Nor does it mean that the person should not be followed for several years to observe new evidences of disease activity. Nevertheless, to be scientific in our practice of medicine and to avoid needless distress, we should refer to such persons as "suspects" until such time as tubercle bacilli can be demonstrated. A firm stand of this sort should clarify confused thinking in mass radiography programs. To put it simply and candidly: do not diagnose pulmonary tuberculosis on the basis of an original X-ray film alone.

One must study "suspected" cases by means of a careful history, including recent or present symptoms which are characteristic of tuberculosis. For differential diagnosis it is essential to employ the tuberculin test, using the intracutaneous method properly applied and interpreted by an experienced person. In the presence of a negative tuberculin test, other reasons than tuberculosis must be found for suspected shadows, in spite of characteristic location and configuration. Indeed, even when a cavity is demonstrated on the film, a negative tuberculin test demands that some etiological factor other than tuberculosis be sought as the cause.

The same criteria used in diagnosis must be applied even more rigidly in the treatment of tuberculosis, especially sanatorium care and chest surgery. Persons whose chest films show shadows, discovered by mass radiography, should not be rushed into the sanatorium simply on the evidence of X-ray findings. A period of follow-up by the physician or clinic will determine the presence or absence of tubercle bacilli in the sputum, gastric contents, or pleural fluid.

Because a social stigma unfortunately attaches to a diagnosis of tuberculosis, and personal harm through mental anguish can occur, restraint should be practiced in naming the disease before its actuality can be proved. Even those persons whose diagnoses are confirmed will profit by a period during which they may become accustomed to the idea that they have a serious disease. Such a practice will keep expensive sanatorium beds free for patients who are truly ill and will avoid unnecessary exposure of non-tuberculous persons sent to sanatoriums by mistake.

Persons who have tuberculosis which requires sanatorium care cannot be greatly harmed by short delay of treatment; in many instances the disease has been present for some time. The chest surgeon, too, should wait and watch with patience until tubercle bacilli are demonstrated as present in the lungs. This is particularly true of the too easily performed procedure of pneumothorax. Before the normal physiology of respiration is permanently changed by surgical attack, there must be strong evidence that such change and its attendant loss of function will be compensated for by the patient's future control of active disease.

There is yet no evidence in medical literature that the minimal lesion case with negative sputum, negative gastric lavage, or no sputum is benefited by sanatorium care. Rather it is a more realistic procedure to seek out and hospitalize the original positive sputum case which infected the minimal case so recently discovered.

We have placed emphasis in these remarks on the asymptomatic case with negative sputum or negative gastric contents. We must, however, be aware of and watch for "indolent" early tuberculosis. Caution is called for in the follow-up of early cases of tuberculosis that present vague findings and symptoms that are often difficult to elicit and interpret. This is the type of tuberculosis which British chest specialists call "indolent early tuberculosis," of whose prognosis we know little. Often such patients, when placed under sanatorium care, recover rapidly without surgical or special aid. Others deteriorate in the sanatorium in spite of the most expert medical skill and the finest facilities. One wonders if both types of cases would not have pursued the same courses undiscovered and unattended. We do not know why the body responds so indolently in these cases. Intensive investigation should help us find the answer, so that our follow-up program can be realistically directed and thereby be made more effective.

To sum up, no person should be labeled with the diagnosis of pulmonary tuberculosis on the basis of incomplete evidence. "Suspected tuberculosis" on the X-ray film must be corroborated by a positive tuberculin test and by positive bacillary findings. Let treatment be delayed and deliberated until all the facts are in and all the evidence is evaluated. If such a practice is followed, physicians will gain in accuracy and skill of diagnosis, and limited hospital resources will be conserved. Most important of all, the person suspected of having tuberculosis will be assured thorough study and scientific diagnosis and will be treated for tuberculosis only if the disease is actually present. Judgments based on positive and complete evidence will give a final verdict that protects the individual and the public health.

**What Is Early Tuberculosis? Herman E. Hilleboe, M.D., Public Health Reports, September 6, 1946.**

### TREATMENT OF TUBERCULOSIS WITH STREPTOMYCIN

The Hinshaw, Feldman and Pfuetze report in the J.A.M.A., November 30, 1946, is up-to-date on this subject. By all means, read it, if you have not already done so.

## CORRESPONDENCE

### MEDICAL SOCIETY MEETING

February 12, 1947

Dear Dr. Johnson:

With regard to the North Carolina Medical Society meeting scheduled for Winston-Salem April 28th to 30th I feel it necessary to notify you at this time that should the attendance run as high as you have estimated, the hotels of Winston-Salem will be unable to accommodate a meeting of this size.

A great percentage of our rooms are occupied permanently here at the Robert E. Lee and have been for some time. I had hoped that some of these rooms would be released to us in order that we could be in a better position to accommodate the many requests which we have had for hotel rooms.

It is certainly with regret that I write this letter to you as I had hoped so much that we could have the North Carolina Medical Society meeting here, particularly at this time when the Doctors and the State are doing so much to promote medical care.

Should you find that your meeting will not be as large as you have estimated, I would appreciate greatly if you will get in touch with me at once to see if there isn't something that could be worked out to take care of your needs.

With kindest personal regards,

Very truly yours,
FRANK L. SWADLEY
*General Manager*

* * * *

### INDUSTRIAL COMMISSION

Dear Doctor:

This is to advise that the Industrial Commission has accepted the proposal of the Special Medical Committee relative to charges for office visits as follows:

| | |
|---|---|
| Ordinary first aid at the office | $3.00 |
| Subsequent office visits: | |
| Dressings by doctor | $2.00 |
| Dressings by nurse, not attended by doctor | $1.00 |

This ruling became effective on January 13, 1947.

The Commission wishes to call your attention to the fact that with this increase in office visit charges the medical profession will now receive 33 1/3 per cent more than the fee listed in the fee schedule and in many instances 100 per cent over that approved before the war.

Very truly yours,
T. A. Wilson
*Chairman*

# BULLETIN BOARD

## PRESIDENT'S MESSAGE

Dr. Coppridge has asked that the president's page this month be devoted to the following article by Dr. W. R. Stanford of Durham.

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## NORTH CAROLINA'S GOOD HEALTH PLAN

W. R. Stanford, M.D.

Durham

There has been much said regarding the Good Health Plan for North Carolina. Most of the things being said are calculated to show the people of North Carolina that the program is needed, and most of them have to do with promoting the hospital end of this plan. Of course, the hospital end of it is, at first glance, the more important, but when one says that, it is as though one said that the barrel of a gun is more important that the stock, because each part of this plan is essential to the whole plan.

At this point I could detail the six points of this plan, but it suffices to say that if you are going to build hospitals in every needy location in North Carolina you are going to have to have personnel to man them, and statistics show that you cannot get adequate personnel from the present sources.

There are three medical schools in North Carolina at present—the four-year schools of Duke and Wake Forest, and the two-year school of the University of North Carolina. The record shows that the University of North Carolina Medical School has furnished a large percentage of the doctors of the state. This is natural and proper, because the University of North Carolina is a state school—a school that caters to local students; it is not fundamentally a cosmopolitan type of institution; and this is one of the many reasons why it is necessary for the state to continue to support a medical school at Chapel Hill.

Since the day of the two-year school is past, then it behooves the state to extend this two-year school into a four-year school, and in so doing, show to the people of North Carolina that the state is able and willing to assume a job that it is proper for it to assume.

It is a reflection on the intelligence of any individual to contend that a foundation, or group of foundations, can do for our citizens that which the state cannot afford to do. It is just as proper for the state to educate its medical students as it is for it to educate its farmers, its engineers, its lawyers, or any of the many groups that it now educates.

Let these other institutions do everything they can to promote and extend their medical activities. Let them give all the students they can a medical education, and even if they do, and if the state goes ahead and does its duty and extends the two-year school into a four-year school, it will be a long time before North Carolina has enough doctors, because the program we have in mind is going to call for good doctors and lots of them.

### *Back of Program*

It seems to me that the people of North Carolina might be interested in knowing some of the fundamental reasons back of this whole health program. The things they have heard about the program are actualities. Some of these actualities may have been slightly magnified. North Carolina has many health problems, but so has every other state in the union.

Our health promoters are correct in saying that North Carolina needs this program worse than many of the other states, and this is true because North Carolina ranks so low in so many fields of social endeavor. In recent years we have been known to brag about the money we have in the treasury, but money in a state treasury that fails to be of benefit to the people of the state is like the miser's hoard, and just as useful. However, some of the fundamental reasons back of this plan are these:

All of you have heard for years about the "threat" of socialized medicine. The socially-minded people in this country, just as in every other nation, have been advocating some medical plan for all the people. Most of you are familiar with the Wagner-Murray-Dingell bill which these gentlemen have been trying to make into a law for the last several years. The ordinary layman must wonder why we are continually being threatened with socialized medicine.

The answer is not hard to find. If a person lives in town and keeps a filthy front or back yard, sooner or later this situation is going to come to the attention of his neighbor, and if he doesn't do something about it himself, pretty soon the neighbors are going to want to do it for him. This is the situation in medicine.

The medical profession cannot adequately answer the indigent patient problem unless hospitals and doctors are readily available to all our citizens. There are thousands of people in North Carolina, and in every other state in the union, to whom adequate medical attention is not available. One might ask, why not answer this problem by socializing medicine? There are a good many reasons why this is not the proper answer. Forty years ago the center of medical progress was in Europe. Today it is in America, and the thing which has placed it here is a free medical profession. No medical profession in the world has equalled or excelled the American medical profession.

*Average doctor*

There is something ennobling about the practice of medicine in an air of freedom. The average doctor who has to go out and compete with his fellow colleagues is inclined to make something very fine out of himself. However, if you were to put the average doctor on a salary, you would probably have only a very "sorry" hired man. We do not have socialized medicine in this country, but we have some examples of the salaried doctor; some of them, of course, are very fine, but there is a tendency in any organization in which they function for the practice of medicine to become a very routine procedure.

The doctors are trying to answer the indigent patient problem in North Carolina. There is nothing new about the idea. There are communities all over North Carolina that have facilities for hospitalizing indigent patients. It will be admitted that in many of these localities this hospitalization is inadequate, but as far as it goes, it is a complete answer to the indigent patient problem.

It is doubtful that any person in Durham, Forsyth, or Mecklenburg counties suffers for lack of proper medical attention, because these counties have facilities for hospitalizing these under-privileged people. So, I repeat that hospitalization by the state and county of these indigent patients is the answer to this problem, plus the care given these patients by a free medical profession.

*What Plans Mean*

This is what your Medical Care Commission for North Carolina plans for you: to make hospital facilities available for the poor people of North Carolina. This hospital plan will also make beds available for every group in the state. For the low-income groups who do not qualify as indigents, this plan offers voluntary hospitalization insurance; in fact, this insurance is available for every group able to pay for it, so that in the final analysis, medical care will be available to every person in North Carolina, regardless of color, race or creed, or financial status.

As intimated earlier, there are many other phases of this plan: the loan fund for worthy students who want to study medicine; the provision to plan for the medical education of the Negro; the plan for a psychiatric unit to be placed at Chapel Hill, which, if used correctly, should be a clearing house for our three other mental institutions.

It might be well to expand this thought a little, because the people of North Carolina have been conditioned by the many things which have appeared in the press regarding the deplorable situations at Raleigh, Goldsboro, and Morganton the last few years. This unit at Chapel Hill should not only be used to diagnose and treat the seriously sick mental patients, but it should be used as a postgraduate school for the staff of these three other institutions, so that within a period of a few years, each of the other institutions will be adequately staffed.

When these hospitals are adequately staffed, then the whole atmosphere of the treatment of the mentally sick in North Carolina will take on a brighter aspect. Then, instead of ranking somewhere between fortieth and forty-eighth in the care of our mentally sick, as we are now, North Carolina could easily rank within the first ten states.

### *Study of Records*

At the beginning of this article, it was intimated that the hospitalization phase of this plan has been most stressed, and it is this phase of the plan that the Hill-Burton bill is calculated to help. A study of the record shows that the hospitalization phase of our plan was worked out before the Hill-Burton bill was thought of. Even in those early days the importance of this plan was realized, because it is only by hospitalization that one can take real medical service to all the people. However, it takes more than bricks and mortar to make a hospital.

One has to have all the equipment which goes to make up a modern hospital, and while the bricks and mortar and the equipment are important, they are worthless unless you have the personnel to handle this equipment and treat the patients. In order to get this personnel it is necessary that the two-year school at Chapel Hill be extended into a four-year school. The doctors which this school will turn out, the nurses, the laboratory and x-ray technicians, the dietitians, the physiotherapists, and so forth, will go a long way toward supplying our outlying hospitals with needed personnel. As already pointed out, the psychiatric unit itself will help correct the difficulties we are having with our mentally sick; in fact, the whole medical school unit is the heart of this health plan.

### *Not a Device*

It has been said many times by the opponents of this plan that this whole business is just a device to get a four-year medical school for the University of North Carolina. Nothing could be more incorrect. The University of North Carolina would undoubtedly get a four-year medical school even if this plan had never been thought of. It is not reasonable to believe that the state of North Carolina, which has already spent much money on a medical school at Chapel Hill, would fail eventually to finish the job, especially since the state has seen fit in the last fifty-six years to develop a fine two-year medical school. Right now, the work of this two-year school is being carried on in one of the finest buildings in the country and, in addition, under this same roof is one of the best schools of public health in the country.

This building will be a tremendous help in carrying on the four-year medical school that is planned at Chapel Hill; in fact, this building represents one of the many economic reasons why this school should be at Chapel Hill and not in some other city. No, this Good Health Plan is not a subterfuge to get a medical school for the University of North Carolina, but, on the contrary, this idea of a state-supported four-year school is the heart of a plan to give every person in North Carolina adequate medical care. The people of North Carolina are intensely interested in this plan.

Is there anything in the world more natural than for the people of the state to expect their university to be out in front for any plan which means as much to the welfare of all the people as does the present Good Health Program? As for the other two medical schools in the state, let us wish them Godspeed; but as said before, it is a reflection on the state of North Carolina to intimate that it is not financially able to carry out the duty it owes to its people.

The present plan advocated by the Good Health Program is the finest medical plan ever advocated by any group in our time, or any other time. If this plan goes through in North Carolina as it should, and if it is copied by other states, then this country will have brought adequate medical care to all its people.

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## NEWS NOTES FROM THE STATE BOARD OF HEALTH

Although the vital statistics record for 1946 has not been compiled, the Division of Epidemiology has listed all cases of reportable diseases for the year. Throughout the year, there were only 9,970 such cases reported to the State Board of Health, exclusive of measles, which runs in cycles and was up last year. The total for the previous year—that is, 1945—was 15,374, exclusive of measles. As to measles, there were 9,011 cases reported last year, as compared with only 1,194 in 1945.

There were only 590 cases of diphtheria reported to the State Board of Health throughout 1946, as compared with 1,475 in 1945. There was also a heavy reduction in the number of typhus fever cases, the total for 1946 having been only 82, as compared with 159 the previous year.

The fight against malaria, also a controllable disease, continued, and there were 185 fewer cases reported in 1946 than in 1945. The total was 369, as compared with 554 in 1945. Typhoid fever, against which there is a continuing war going on, fell off 28 cases last year; but there were 45 cases of rabbit fever—or tularemia—as compared with only 27 in 1945. There were only 9 cases of undulant fever reported for the year, compared with 15 in 1945.

There was a sharp decline in the incidence of whooping cough last year. In fact only 3,391 cases were reported in all parts of the state, against 5,834 in 1945—a decrease of 2,443.

The most conspicuous and convincing example of the effectiveness of preventive medicine is smallpox, of which there were only 2 cases among North Carolina's nearly 4,000,000 last year.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

### Announcement of a Course in Medical Mycology

A month's course in medical mycology, under the direction of Dr. Norman F. Conant, is to be offered at Duke University School of Medicine and Duke Hospital, during July, 1947. The course will be offered every day in the week, except Sunday, and has been designed to insure a working knowledge of the human pathogenic fungi within the time allotted.

Emphasis will be placed on the practical aspects of the laboratory as an aid in helping establish a diagnosis of fungus infection. Insofar as possible and as patients become available, methods of collecting materials in the clinic for study and culture will be stressed. Work with patients, clinical material, cultures and laboratory animals will serve as a basis for this course. Also, an opportunity to study pathologic material, gross and microscopic, will be given those whose previous training would allow them to obtain the greatest benefit from a study of such material.

The number admitted to the course will be limited, and the applications will be considered in the order in which they are received. An attempt will be made, however, to select students on the basis of their previous training and their stated need for this type of work.

A fee of $50.00 will be charged for this course, upon the completion of which a suitable certificate will be awarded. Inquiries should be directed to Dr. Norman F. Conant, Duke University School of Medicine, Durham, N. C.

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Dr. Hans Lowenbach, associate professor of neuropsychiatry at Duke University Hospital and School of Medicine, resumed his work at Duke recently following a six months' assignment in occupied Germany for the purpose of gathering manuscripts on medical and related research, which had remained unpublished due to the war and post-war conditions.

While in Germany Dr. Lowenbach visited, under sponsorship of F.I.A.T. (Field Intelligence Agency Technical), schools in zones under United States, British, and French occupation, and in Berlin. More than 25,000 pages of original manuscripts in all fields of medicine, both research and clinical, were collected and microfilmed. Most of the papers concerned research hitherto held secret under German wartime restriction. Subjects were largely on general pathology, neuropsychiatry, and high altitude studies.

This material is now on its way to this country to be catalogued and abstracted, and will be immediately available to the public through the office of the Publications Boards, Department of Commerce, 16th and K. Street, Washington 25, D. C.

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

Dr. George Harrell, professor of clinical medicine, presented a paper entitled "A Bacteriologic Study of the Factors Affecting the Efficacy of Streptomycin Therapy of Urinary Tract Infections" at a symposium on "Research in Antibiotics," held in Washington January 31 and February 1 under the auspices of the Antibiotics Study Section, Research Grants Division, National Institute of Health. Authors of the paper were Dr. Harrell, Dr. E. Garland Herndon, Jr., Dr. Charles M. Gillikin, and Dr. Jerry K. Aikawa.

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Dr. Frank Lock, professor of obstetrics and gynecology, attended the meeting of the South Atlantic Association of Obstetricians and Gynecologists in Savannah, February 5-9, and presented a paper on "The Incidence of Psychosomatic Disease in a Private Referred Gynecologic Practice." Other members of the department who attended the meeting were Dr. James F. Donnelly, co-author of the article, and Dr. C. H. Mauzy.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

The 1947 annual meeting of the National Tuberculosis Association and the American Trudeau Society will be held in San Francisco, June 17-20.

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Mr. T. Hunter Bell, former treasurer of the State Association, died at his home in Greensboro on December 24.

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Walter S. Page, Jr., Seal Sale Director, has resigned to accept a position in New Jersey. He was succeeded by David E. Sigmon of Cooleemee.

## STATE BOARD OF MEDICAL EXAMINERS

The annual examinations of the Board of Medical Examiners of the State of North Carolina will be held June 23-26, 1947, at the Sir Walter Hotel in Raleigh. Applicants for licensure by endorsement will be interviewed on June 24.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

Dr. John G. Smith and Dr. R. D. Kornegay were speakers at the January meeting of the Edgecombe-Nash Counties Medical Society, held in Rocky Mount on January 8. Dr. Smith's subject was "Diverticulae of the Small Intestine," and Dr. Kornegay spoke on the "Use of Procaine in Acute Traumatic Injuries."

## FORSYTH COUNTY MEDICAL SOCIETY

A dinner meeting of the Forsyth County Medical Society was held in Winston-Salem on January 14. A paper on "Diagnosis and Treatment of Surgical Lesions of the Colon" was presented by Dr. R. L. Sanders of Memphis, Tennessee.

## HALIFAX COUNTY MEDICAL SOCIETY

Officers of the Halifax County Medical Society for 1947 are as follows: President, Dr. Thomas J. Taylor, Roanoke Rapids; vice president, Dr. E. B. Smith, Enfield; secretary-treasurer, Dr. Matthew S. Broun, Roanoke Rapids.

## PITT COUNTY MEDICAL AND DENTAL SOCIETY

The regular monthly meeting of the Pitt County Medical and Dental Society was held in Greenville January 9, with Dr. J. M. Mewborn, Farmville, presiding.

The program consisted of a paper entitled "Operative Obstetrics" by Dr. W. H. Pott, Surgeon, Pitt General Hospital, and the "Annual Report of the Pitt County Health Department" by Dr. N. Thomas Ennett, Pitt County Health Officer.

The meeting was held at the Greenville Airport Inn, with Drs. S. M. Crisp and N. Thomas Ennett, hosts.

## WARREN COUNTY MEDICAL SOCIETY

At the January meeting of the Warren County Medical Society, held in Warrenton, the following officers were elected for 1947: President, Dr. G. H. Macon, Warrenton; vice president, Dr. C. H. Peete, Warrenton; secretary-treasurer, Dr. H. H. Foster of Norlina. Dr. W. D. Rodgers was appointed to represent the society in the good health movement, and Drs. C. H. Peete and H. H. Foster were named delegates to the State Medical Society, with Dr. F. B. Hunter as alternate.

The society endorsed the hospital building program of the Medical Care Commission, but took no action in regard to the proposed four-year medical school at Chapel Hill. The society recommended that Dr. G. H. Macon serve as county physician of Warren County for a two-year period.

## NEWS NOTES

Dr. Sherwood W. Barefoot, formerly instructor in dermatology and syphilology at the Duke University School of Medicine, has entered the practice of dermatology in Greensboro.

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Dr. J. Rush Shull and Dr. James E. Hemphill of Charlotte have announced the association of Dr. Harold S. Petit, recently of the resident radiological staff of Harvard University, in the practice of radiology.

## SOUTHERN SOCIETY FOR CLINICAL RESEARCH

The first annual meeting of the Southern Society for Clinical Research was held in New Orleans, January 24 and 25. Among the speakers on the program were Drs. Alex W. Boone and Keith S. Grimson of Durham and Drs. David Caver, Victor Crescenzo, George Harrell, and W. C. Thomas of Winston-Salem. Dr. Joseph Beard of Durham was elected councilor for a three-year term, and Dr. Harold Green of Winston-Salem for one year.

## NEWS NOTES FROM THE AMERICAN MEDICAL ASSOCIATION

### Meetings

The forty-third annual congress on Medical Education and Licensure convened at the Palmer House, Chicago, on February 9, 10 and 11, 1947.

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The second annual meeting of the National Conference on Rural Health was held at the Palmer House on February 7 and 8, 1947.

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### Broadcasts

The Bureau of Health Education announces radio broadcasts over the Mutual Broadcasting System for twenty-six weeks beginning Monday, February 3, at 10:30 P.M. Eastern Standard Time. The title will be **"Doctor Graham and Family."**

The program will deal with a typical physician in general practice in an imaginary town of about 100,000 people, set in an agricultural county. There will be no medical speaker. There will be very little medicine in the program except as the doctor's practice affects his life. Primarily, the program will be interpretive rather than educational.

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The American Medical Association, in celebration of its centennial in 1947, is presenting a series of twenty-six N.B.C. dramatized broadcasts on the progress of medicine in the United States during the hundred years of the association's existence.

This is the twelfth annual series of A.M.A.-N.B.C. broadcasts. The series, which began on Dec. 7, 1946, is entitled "Doctors—Then and Now," and the theme is "A Century of Progress by American Medicine."

States with similar histories and similar general characteristics are grouped together so that in all twenty-five regions are represented. One broadcast is devoted to medical progress in each of these regions, and the twenty-sixth and closing week will deal with the one hundred years of the American Medical Association from a nation-wide standpoint.

Each broadcast is divided into two parts. The first part consists of a dramatization dealing with historic physicians and medical events in the region and the second part features a speaker representing the medical societies in that region.

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### Associated Medical Care Plans

The officers and commission members have announced the opening of an office at 535 North Dearborn Street and the appointment of Frank E. Smith as director of Associated Medical Care Plans.

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### Voluntary Health Plans

"Driving to complete the voluntary health insurance program for the care of the American people is the big job facing local, state and national medical organizations today," according to Thomas A. Hendricks, secretary of the Council on Medical Service of the American Medical Association. "More than eighty plans sponsored by medical societies in thirty-three states covering 4,000,000 persons are now in operation and the task has just begun."

## PAMPHLET ON RHEUMATIC FEVER

In observance of National Heart Week, February 9-14 the Public Affairs Committee, Inc., has issued "Rheumatic Fever—Childhood's Greatest Enemy," by Herbert Yahraes, the most comprehensive and readable pamphlet yet written on the disease that cripples and destroys more children of school age than any other disease, and that affects more than a million persons, young and old, in the United States.

"Rheumatic Fever—Childhood's Greatest Enemy," by Herbert Yahraes, is Pamphlet No. 126 in the series of popular, factual, ten-cent pamphlets issued by the Public Affairs Committee, Inc., nonprofit educational organization at 22 East 38th Street, New York 16, N. Y.

## THIRD AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The program of the Third American Congress on Obstetrics and Gynecology, to be held September 8-12, 1947, in St. Louis, will feature general sessions for all groups making up the Congress as well as smaller individual group meetings and round-table discussions. A large Scientific and Educational Exhibit is being set up under the direction of Dr. J. P. Pratt of Detroit and a comprehensive Motion Picture Program is being arranged by Dr. John Parks of Washington, D. C. The committees assisting these doctors will review applications by prospective participants late this spring. Anyone wishing to make application for space in the Scientific Exhibit or for time on the Motion Picture Program may obtain the proper blanks from the office of the Congress at 24 West Ohio Street, Chicago 10, Illinois.

## POSTGRADUATE COURSES IN RADIOLOGY

The American College of Radiology and the Philadelphia Roentgen Ray Society are offering a postgraduate course on certain neoplastic and inflammatory diseases in Philadelphia, March 31 to April 4. The fee for the course is $50, and applications should be mailed to the American College of Radiology, Postgraduate Courses, 20 North Wacker Drive, Chicago 6, Illinois.

## THE AMERICAN SOCIETY FOR THE STUDY OF STERILITY

The third annual convention of the American Society for the Study of Sterility will be held at the Hotel Strand, Atlantic City, New Jersey, on June 7 and 8, 1947, preceding the annual A.M.A. Convention. Registration for the sessions is open to members of the medical and allied professions.

Additional information may be obtained from the secretary, Dr. John O. Haman, 490 Post Street, San Francisco 2, California.

## AMERICAN FOUNDATION FOR TROPICAL MEDICINE

Dr. Neil Hamilton Fairley, Wellcome professor of tropical medicine of the London School of Hygiene and Tropical Medicine, received the Richard Pearson Strong Medal presented by the American Foundation for Tropical Medicine, for his work as chairman of the combined Advisory Committee on Tropical Medicine to General MacArthur in the Pacific during World War II. Presentation was made by Colonel Strong, U.S.M.C. (retired), for whom the medal and award was named, and who received it first in February, 1944.

## UNITED NATIONS RELIEF AND REHABILITATION ADMINISTRATION

The international epidemiological reporting service formerly provided by UNRRA will henceforth be carried on under the auspices of the Interim Commission of the World Health Organization. The World Health Organization, which recently received a million and a half dollar transfer of funds from UNRRA, will continue aid to needy countries for training health personnel and in the control of tuberculosis, malaria and other diseases.

Consulting doctors, nurses and other health personnel will, however, remain as part of UNRRA's operating staff in China through March, and with the displaced persons in Europe through June, 1947.

## NEW YORK ACADEMY OF MEDICINE CENTENNIAL CELEBRATION

The year 1947 marks the one hundredth anniversary of the founding of the New York Academy of Medicine. The months of March and April have been designated by the Council of the Academy for special observance and commemoration. Throughout the Centennial the major theme will be concerned with the role of medicine in the changing social order of today.

## PLANNED PARENTHOOD FEDERATION OF AMERICA, INC.

An overwhelming majority of American physicians approve of birth control for economic and social reasons, as well as to safeguard health, the first scientific, comprehensive poll on the subject reveals. The results of this poll were announced by Dr. Alan F. Guttmacher of Baltimore to 600 leading supporters of the Planned Parenthood movement. Dr. Guttmacher polled 15,000 physicians all over the country, and as a result of detailed answers to his questionnaire, he was able to present for the first time a documented analysis of how and why most doctors favor birth control.

Ninety-seven and eight tenths per cent of the physicians polled by Dr. Guttmacher approved birth control measures for health reasons; 86 per cent approved it for pregnancy spacing, and 79.4 per cent approved conception control for economic reasons. Marital adjustment was considered an indication for contraception by 72 per cent of the physicians polled. The West represented the most liberal medical opinion toward contraception, the South next, with the Central area in third position and the Northeast least approving.

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Dr. Alan F. Guttmacher of Baltimore, Md., and Dr. Abraham Stone of New York City were named as winners of the third annual Lasker Awards of the Planned Parenthood Federation of America by Dr. Robert L. Dickinson, spokesman for the Federation's Lasker Award Committee.

Presented to the Federation by the Albert and Mary Lasker Foundation, the Awards consist of a medallion and a $500 cash prize for each winner.

## VETERANS ADMINISTRATION

Veterans with service-incurred disabilities in thirty-two states, Hawaii and the District of Columbia may obtain free medical treatment from physicians of their choice under two different plans of the Veterans Administration home-town medical care program. Both plans enable veterans with service-incurred or service-aggravated ailments, upon approval of their VA medical officers, to go to the local physician of their choice for treatment of that service-connected ailment **only**.

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Veterans Administration has reported that 1,339 women war veterans were patients in VA hospitals or in other hospitals under contract to VA on November 30, 1946.

Women veterans are entitled to the same medical care as male veterans. In addition, they may receive hospitalization for non-service-connected disabilities in civil hospitals as well as in VA hospitals and clinics.

(BULLETIN BOARD CONTINUED ON PAGE 114)

# AUXILIARY

## SANATORIA BEDS

I address this article on the three Sanatoria Beds to the doctors' wives in the state who are not auxiliary members. Those of us who belong to the Auxiliary to the Medical Society of the State of North Carolina know that our projects alone make it worth while for us to be an organization. I feel that if everyone knew how the Auxiliary dues are spent there would not be a single doctor's wife in the state who would fail to send in her dues. If you happen to be in an unorganized county, you can become a member-at-large by sending your dues ($1.00) to Mrs. E. C. Judd, 2108 Woodland Avenue, Raleigh, N. C. Otherwise, look up your local branch treasurer and give her your dollar as soon as you have finished reading this article.

From dues paid, fifty cents of each dollar is used to make it possible for tuberculous North Carolina doctors and nurses to stay in a sanatorium without financial worry as long as necessary. We support three such beds—one in the Western Carolina Sanatorium at Black Mountain, one in the State Sanatorium at Sanatorium, North Carolina, and one in the Eastern Carolina Sanatorium at Wilson.

Each of our beds is now occupied by a nurse, but a few years ago a doctor occupied one bed for several years. There is a chairman for each bed who personally keeps in touch with our guests and tries to care for their needs. She also interests the branches of the Auxiliary in contributing to the Endowment Fund. Our chairmen at present are:

McCain Bed: Mrs. W. P. Richardson
Chapel Hill

Stevens Bed: Mrs. G. M. Billings
Morganton

Cooper Bed: Mrs. M. I. Fleming
Rocky Mount

The beds all have Endowment Funds, which are added to by the county auxiliaries or by personal gifts. The McCain Bed is our oldest bed and has the largest endowment. This bed is named for our beloved Dr. and Mrs. P. P. McCain. Following Dr. McCain's death in an automobile accident last November, many people sent donations to be applied to the Endowment Fund in his honor. This is the kind of memorial he would have liked most.

The beds are all named in honor of North Carolina doctors to show our appreciation of their supreme unselfishness and untiring efforts in the greatest of the professions.

Mrs. B. W. Roberts,
*Second Vice President and*
*Chairman of Activities*
Durham

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**There is no doubt that the most important of all case-finding agencies in the fight against tuberculosis are its practicing physicians.** It is almost always true that the family physician has the first opportunity not only to ascertain the presence of tuberculosis among the people, but also to give battle for the cure of the afflicted and to safeguard the other members of the family from the tubercle bacillus. For it is the family physician to whom most people go when troubled by signs of ill health.

The records in the chest diagnosis clinics prove that the physicians, if they are determined to do so, can perform a better job of suspecting and discovering active tuberculosis cases, year in and year out, than any other agency. Report of Comm. on Tbc. N. H. Med. Soc., N.E. Jour. Med., Sept. 26, 1946.

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### Six Antimalarials Reviewed by Dr. Rice in Puerto Rico

Clinical experience with six drugs now available for attacking malaria was reviewed by Dr. Justus B. Rice, vice-president in charge of medical research of the Winthrop Chemical Company, Inc., in a scientific paper presented before the recent convention of the Insular Medical Society in San Juan, Puerto Rico. The six drugs listed by Dr. Rice are Aralen, Atabrine, Quinine, Paludrine, Pentaquine, and Plasmochin.

Aralen was described by Dr. Rice as the drug of choice of all available drugs. It definitely cures falciparum malaria, often fatal form of the disease, he said.

"Aralen, Atabrine, Quinine and Paludrine all successfully attack the erythrocytic cycle of the disease, responsible for the distressing symptoms of all forms of malaria," Dr. Rice said. "Of interest chiefly to public health officials is Plasmochin, which does not cure, but which attacks the gametocyte cycle of the disease, limiting its spread by preventing mosquitoes from becoming infected.

"While clinical research has demonstrated that the exoerythrocytic cycle of malaria responsible for relapses in the vivax form of the disease is vulnerable to attack, Pentaquine, the drug which has been tested, has been found too dangerous for general use."

Pentaquine is still undergoing research, Dr. Rice said, but he added that it seems unlikely that it will achieve widespread use in its present form because of its toxicity to human red blood cells.

# BOOK REVIEWS

**An Integrated Practice of Medicine** — A Complete General Practice of Medicine from Differential Diagnosis by Presenting Symptoms to Specific Management of the Patient. By Harold Thomas Hyman, M.D., Volumes I, II, III, and IV, and Index. 1184 illustrations, 305 in color. 319 Differential Diagnostic Tables. Price: $50.00 per set. Philadelphia and London: W. B. Saunders Company, 1947.

This is perhaps the most ambitious work yet undertaken for the general practitioner. It is, of course, impossible to read in a few weeks' time the more than four thousand pages which make up the set, but a good idea of its scope and practicability is to be had by the sampling process. On the whole, the impression thus formed was favorable. The numerous tables of differential diagnosis are quite helpful in the evaluation of a patient's presenting symptoms; the discussions of the etiology, pathology, clinical manifestations, and treatment of most conditions are presented in an interesting style, and are free from elaborate theorizing. The busy general practitioner should be able to review quickly the salient points about most of the common conditions for which his patients consult him. One feature which will appeal to many is that the author gives the remedies which he himself has found useful, and dismisses with refreshing brevity those which he has found useless.

The illustrations, especially the colored plates, are excellent and most helpful. This reviewer was particularly impressed by the views illustrating various conditions of the ocular fundus.

Throughout the work will be found helpful hints in the art as well as the science of medicine, which could have been written only by an experienced family doctor. The section on prognosis is a particularly good example. Prognosis is perhaps the most difficult part of medical practice, and Dr. Hyman's discussion of it should be of great help in mastering the subject. The factors which influence prognosis are all enumerated, from the nature of the disease to the disposition of the individual physician. There is a very helpful appendix dealing with the establishment of a practice and the personal problems of the practitioner.

As might be expected, the work is not perfect, and will doubtless be improved in future editions. For example, the rather common condition of metabolic craniopathy, or hyperostosis frontalis, is not mentioned, though Grollman and Rousseau found it in 1 per cent of the patients admitted to the North Carolina Baptist Hospital over a period of two and a half years. The description of pancreatitis is inadequate, and the only treatment recommended is surgery, in spite of the now generally accepted view that conservative treatment is usually to be preferred. Dercum's disease, or adiposis dolorosa, is also given too scant consideration, and obesity is overemphasized as a pathognomonic point.

In spite of these minor criticisms, the book can be recommended as more nearly covering the entire field of general medicine than any other this reviewer knows of, and as offering a unique approach to the study of one's patients.

**The Treatment of Bronchial Asthma.** By Vincent J. Derbes, M.D., Instructor in Medicine and in Preventive Medicine, Tulane University School of Medicine, New Orleans; and Hugo Tristram Englehart, M.D. Instructor in Clinical Medicine, Baylor University College of Medicine, Houston, Texas. With chapters by a panel of sixteen additional contributors. 466 pages. Price, $8.00. Philadelphia: J. B. Lippincott Co., 1946.

On the whole this is an excellent treatise on a very important problem. The statistical information prepared by Louis I. Dublin and Herbert H. Marks deserves special mention, for the socio-economic aspect of asthma, so obvious from case to case, has received too little attention from the mass standpoint. This presentation has no equal in any text with which this reviewer is familiar. The chapter on anatomy and physiology of the respiratory tract by Dr. George E. Burch also deserves special mention. Here the fundamentals so essential to a clear understanding of the pathologic processes involved in asthma are comprehensively presented, yet with a simplicity and clarity seldom encountered.

The chapter on cardiac asthma by Paul D. White is also excellent. Since this condition is not in reality a true asthma, some may question the propriety of its inclusion in this book. It is so frequently confounded with true asthma, however, and the differential diagnosis is at times attended with such difficulty that a chapter on the subject seems justified.

In the chapter on parasitic agents in the causation of asthma, the author does not stay very close to his subject. Fungi spores receive over-emphasis as causes of asthma, appearing equal in importance to the pollens.

In the chapter on non-allergic treatment, no mention of the antihistaminic agents is made. A number of errors, mostly technical, are to be found. On page 174, for instance, ragweeds are accorded the rank of a family—certainly not in accordance with accepted botanical classification. Such errors do not, of course, detract from the general usefulness of the book.

**The Challenge of Polio. The Crusade Against Infantile Paralysis.** By Roland H. Berg. 208 pages. Price, $2.50. New York: The Dial Press, 1946.

This small book is an interesting story of the problems of poliomyelitis. Beginning with an account of the erroneous ideas about polio current at the time of the 1916 epidemic, it carries one up to the advances of the past few years.

The review of the false hopes that have arisen in the past in regard to the prevention of polio by the use of vaccines serves as a reminder that we must take all discoveries with a grain of salt until they have been proved in the actual field.

The founding of the National Foundation for Infantile Paralysis is outlined briefly, and the National Foundation's work at the present time, both in epidemic aid and in aid in research, is summarized.

This is a book which will make much clearer the reasons that polio remains a baffling disease, but one which may be eventually controlled by the coordinated effort of the many research teams which are now being backed by the National Foundation for Infantile Paralysis.

**The Essentials of Obstetrics and Gynecology.** By William Albert Scott, B.A., M.B., F.R.C.S. (Can.), F.R.C.O.G. (Eng.), Professor of Obstetrics and Gynecology, University of Toronto; and H. Brookfield Van Wyck, B.A., M.B., F.R.C.S., (Can), F.R.C.O.G. (Eng.), Assistant Professor of Obstetrics and Gynecology, University of Toronto. 390 pages, 91 illustrations, 13 in color. Price, $5.50. Philadelphia: Lea & Febiger, 1946.

Drs. Scott and Van Wyck in the preface of this book state that it is an attempt to present the fundamentals of obstetrics and gynecology in a comparatively small compass. The authors have used as a basis for the text the lectures given to their students at the University of Toronto. They have succeeded admirably in condensing this bulky material, while discussing every important subject in some detail.

In some instances the methods of treatment advocated are different from those usually practiced in this country. For instance, the statement is made on page 134 that laparotomy and drainage should be carried out when there is definite evidence of purulent peritonitis which does not respond to chemotherapy, unless a bloodstream infection is present. In the management of the third stage, the authors advocate an attempt at Crede expression of the placenta one hour after the delivery of the child, and consideration of manual removal of the placenta in one and a half hours. The technique of removal is not described, and the importance of hospitalization and blood matching is not emphasized.

In general the text represents an excellent brief presentation of the subject.

# In Memoriam

## J. N. JOHNSON, D.D.S.

Resolved, That the members of the North Carolina State Board of Health adopt these resolutions in tribute to the memory of our late fellow member and distinguished colleague, John Nordham Johnson.

The Board has lost other distinguished and valued members. None is more genuinely mourned both as to personal loss and as to the loss of his wise counsel than is Dr. Johnson.

By his death the Board has lost a beloved associate and a great personality. Dr. Johnson was a member of the Board of Health for fifteen years, having served as vice-president since 1934. To the work and deliberations of the Board he brought a keen mind, a fine background of scientific knowledge, insight into the health needs and opportunities in our State, and enthusiasm and vigor in supporting the cause of public health and the activities of the State Board of Health. His memory and influence will remain as an inspiration to those who worked with him.

Resolved further, That a copy of these resolutions be spread upon the official minutes of the State Board of Health and that a copy be sent to Mrs. Johnson that we may extend to her and to the members of the family this expression of our sincere sympathy and our heartfelt condolence.

W. T. Rainey
G. G. Dixon
Paul E. Jones

# BULLETIN BOARD

(CONTINUED FROM PAGE 111)

## NEWS NOTES FROM THE OFFICE OF THE SURGEON GENERAL

### Surgeon General Designates New Commandant of Army Medical Library

Colonel Joseph H. McNinch, M.C. has been designated Commandant of the Army Medical Library by The Surgeon General, succeeding Colonel Leon L. Gardner.

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### Colonel Raymond O. Dart Named Director of the Army Institute of Pathology

Major General Norman T. Kirk, The Surgeon General, recently announced that Colonel Raymond O. Dart, M.C., has succeeded Colonel James E. Ash, M.C., as Director of the Army Institute of Pathology, Seventh Street and Independence Avenue, S.W., Washington, D. C.

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### Improved Artificial Hand Announced

A new artificial hand which represents a major advance in the manufacture of prostheses for amputees has been announced by Major General Norman T. Kirk, The Surgeon General of the Army.

Both cosmetically and mechanically this hand is far superior to anything that has been perfected to date, according to Major Maurice J. Fletcher, Director of the Prosthetics Laboratory of the Army Medical Center which developed the hand.

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### New Water-Purifying Tablet Developed by Army

A new tablet for purifying water in the soldier's canteen which is considered superior to the chlorine-type tablets used during the war has been announced by the War Department.

With iodine employed instead of chlorine, the new tablets make the drinking water less objectionable in taste and odor. Tests have shown that the iodine-containing tablet has greater sterilizing flexibility in that it can be used under a wide range of conditions. It also dissolves more quickly than its predecessor. This tablet was developed by scientists of the Army Medical Department, Quartermaster Corps and Corps of Engineers.

After examining a large number of different compounds, scientists found that triglycine hydroperiodide was a safe and highly effective agent. Additional tests of the new "tablet, water purification, individual, iodine," as the compound has been designated, will be carried out during the ensuing year.

### Schering Award Winner Receives Prize

Mr. Bent G. Boving, first prize winner of the 1946 Schering Award, recently received from Mr. Francis C. Brown, president of Schering Corporation at Bloomfield, New Jersey a check for $500 for his winning essay on "The Role of Hormones in Sterility."

Second prize winner William O. Maddock, of Portland, Oregon, a student at the University of Oregon Medical School, has been presented an award of $300 by Mr. Harland Belscamper of the Schering West Coast professional service staff.

Third prize, a tie award, was won by Mr. Lioned Mapp of the McGill University Faculty of Medicine in Toronto and by Mr. Stonewall B. Stickney of Tulane University School of Medicine, each receiving duplicate awards of $200.

NORTH CAROLINA MEDICAL JOURNAL

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# FREDERIC MOIR HANES

*Late Florence McAlister Professor of Medicine*
*Duke University School of Medicine*

HARVIE BRANSCOMB, Ph.D., *Dean*
DUKE UNIVERSITY DIVINITY SCHOOL

No one of us who has known Dr. Frederic M. Hanes would want to undertake at this hour to state what he meant to us and to this community. We cannot, however, refrain from giving some expression to our sense of gratitude that we were his colleagues, his students, his friends.

He was a scientist. He secured the best training which two continents afforded. He held appointments of distinction in the field of medicine, and was associated with some of the great medical figures of all time. This training and skill he devoted to his native state, first in the city of his birth, then as the administrative head and virtual organizer of the Department of Medicine in this medical school and hospital. He made many contributions to the progress of medicine, publishing numerous valuable articles in scientific journals, and stimulating, directing, and aiding research in his own department and throughout the university. In addition, he was a teacher and a physician. To his students he taught sound and tested principles of medical practice and much besides—the wisdom which came from his broad experience, and the ideals which came from his own character. To his patients he gave himself with that unsparing alertness characteristic of the medical profession at its best.

He was ever responsive to the claims of public service. When the first world war came, he resigned his practice at home, placed himself at the disposition of the government, and served in charge of Base Hospital 65 in France. He accepted positions on state boards and in the work of national philanthropic agencies of many sorts at great expense of time and strength. His services in this area of public life and responsibility were too numerous and too varied ever to be listed or described.

These things are a proud memory to us who knew him, but they are probably not the things which stand out most in our minds today. He was distinguished in the art of medicine, but he excelled also in a much more difficult art, the art of living. The art of living rests upon two principles—a faith in life and a knowledge of and willingness to respond to true values. Dr. Hanes had faith in life. He loved it in all its forms, and his interests were almost limitless. He had learned to know and choose the true values. He chose the arduous activity of the scientist instead of the leisure which was available to him, the enjoyment and creation of beauty rather than the pursuit of ambition, the service of society instead of escape from obligation. He loved much, and he gave of himself and his means to the things which he loved. Thus his many-sided personality has impressed itself upon our institutions, even upon our landscape, but most of all upon our hearts.

There is a phrase in the Old Testament which has repeatedly come into my mind in these last two days. "In those days," says the Scripture, speaking of the possession of

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Read in Memorial Services for Dr. Frederic Moir Hanes in the Duke Chapel, March 26, 1946.

the land of Canaan, "there were giants in the land." If we so live that those who come after us will inhabit a new and lovelier Canaan, I do not doubt that when they reflect upon those who did most to make their land so fair and good, and recall the deeds and character of Dr. Hanes, they will say to their children, "In those days there were, indeed, giants in the land."

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## THE DIAGNOSIS AND MANAGEMENT OF TINEA CAPITIS

J. Lamar Callaway, M.D.
*and*
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The problem of epidemic tinea capitis—ringworm of the scalp—among school children of large urban centers has caused much concern in the past few years. An increasing number of cases reported between 1940 and 1945 from the northeastern states—New York(1), Maryland(2), and Pennsylvania(3)—and from Michigan(4) has served to emphasize the infectiousness of tinea capitis and the importance of this disease from a public health standpoint. Because these epidemics have been caused predominantly by infection with Microsporum audouini, the human pathogenic fungus which does not respond readily to treatment, the problem of prevention and control has been extremely difficult.

An epidemic of tinea capitis, caused by M. audouini, has been reported recently from the schools of Graham(5). Isolated cases have been seen from Rocky Mount, Greensboro, and Fayetteville. There is no doubt, therefore, that the infection has become established in North Carolina. Physicians in the state should report known cases and small epidemic foci to the proper health authorities for evaluation, so that immediate attempts at control may be instituted before large numbers of school children become infected.

### *The Medical Problem*

Two types of fungi have been responsible for the majority of tinea capitis in this country—namely, M. lanosum and M. audouini. The former is recognized as the so-called animal pathogen, since it commonly causes infection among cats, dogs, horses, and cattle. It occasionally infects human beings who come in contact with such infected animals, causing tinea capitis or tinea corporis in children and only tinea corporis in adults. Control measures should include the treatment of such animal contacts, or provisions for their disposal. Human infections with M. lanosum, however, tend to be sporadic and to heal spontaneously or respond to local treatment over a short period of time.

M. audouini is regarded as a human pathogen, since it cannot be isolated from animals or transferred to laboratory animals by inoculation. This fungus, therefore, spreads from person to person and is the cause of epidemic tinea capitis among children. Infections with M. audouini respond best to x-ray treatment; they heal spontaneously only at puberty, and do not respond readily to local medication. Since x-ray treatment of large numbers of children presents many difficulties, this type of therapy cannot always be used. Unless adequately treated, however, an infected child remains a constant source of infection until he reaches puberty. Because successful treatment requires three to six months in those few cases which do respond to local medication, it is not feasible to remove an infected child from school. Furthermore, such children will act as a focus of infection among the preschool youngsters during the day and will readily come into contact with their schoolmates after the school day is over. An epidemic of tinea capitis caused by M. audouini, therefore, presents a serious public health problem. The infection is maintained by contact from person to person, and treatment is extremely difficult. The treatment period in successful cases extends from three to six

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From the Division of Dermatology and Syphilology of the Department of Medicine and from the Division of Bacteriology and Mycology, Duke University School of Medicine.

1. (a) Lewis, G. M., et al.: Measures to Prevent and Control an Epidemic of Ringworm of the Scalp, New York J. Med. 44:1327-1333 (June 15) 1944.
   (b) Miller, J. L., Lowenfish, F. P. and Beattie, G. F.: Local Treatment of Tinea Capitis, J.A.M.A. 132:67-70 (Sept. 14) 1946.
   (c) Lewis, G. M., Hopper, M. E., and Reiss, F.: Ringworm of the Scalp, J.A.M.A. 132:62-65 (Sept. 14) 1946.
2. Schwartz, L., Peck, S. M., Botvinick, I., and Leibovitz, A. L.: Control of Ringworm of the Scalp among School Children in Hagerstown, Maryland, 1944-1945, J.A.M.A. 132:58-62 (Sept. 14) 1946.
3. Livingood, C. S. and Pillsbury, D. M.: Ringworm of the Scalp, J. Invest. Dermat. 4:43-57 (Feb.) 1941.
4. (a) Burket, L. V.: Present Status of Ringworm Epidermis, Bull. Genessee County M. Soc. (Michigan) 17:6 (June 23) 1945.
   (b) Carrick, L.: The Epidemiology of Tinea Capitis in Detroit School Children, J. Michigan M. Soc. 45:347-352 (March) 1946.
5. Dr. Mildred Morehead of the United States Public Health Service and Dr. J. Roy Hege of the North Carolina State Board of Health are working with the physicians and the local health department in the control of this epidemic.

Frederic Moir Hanes, M.D.

September 18, 1883

March 25, 1946

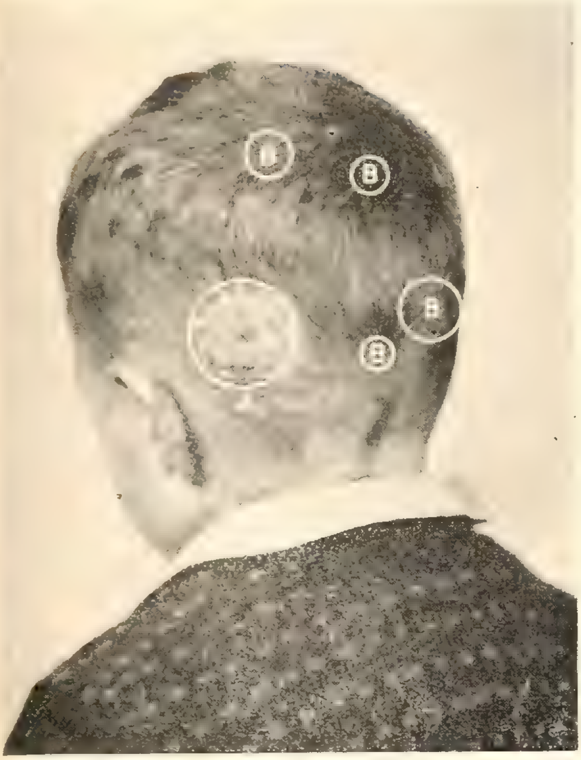

Fig. 1. Photograph of patient with tinea capitis. Area "A" shows clinical involvement and is fluorescent under Wood's light. Areas "B" show no clinical involvement but show brilliant fluorescence under Wood's light.

months, but may continue in some cases until the age of puberty.

### *Diagnosis*

There is no greater aid in the diagnosis of tinea capitis than the Wood's light(6). Infected hairs fluoresce when exposed to this light in a semi-dark room. The entire scalp should be examined carefully for fluorescent areas which denote infection. An occasional patient may show fluorescence of the eyelashes. In boys the infection is usually seen at the hair line (fig. 1), while girls are more frequently infected at the vertex. Scattered areas of infection may be present in both sexes, however, and an occasional child will show infection of the entire scalp. This method of examination not only allows an accurate determination of the extent of infection on the scalp, but also permits the examiner to detect a minimal infection which might pass ordinary inspection. Several children can be examined in a short period of time, and those showing fluorescent areas should be separated for further examination. Occasionally patients who are under treatment may not show fluorescent areas, even though they are still infected.

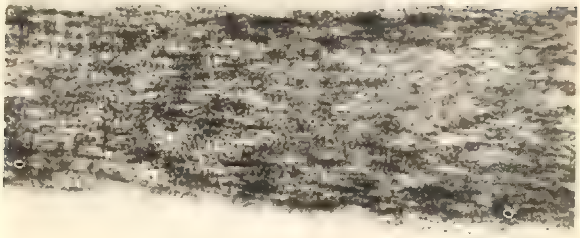

Fig. 2. Photomicrograph of hair, showing organisms in the sheath.

Hairs from areas which fluoresce or from patients suspected of having infection even though they show no fluorescent areas should be epilated and examined microscopically in a 10 per cent potassium hydroxide preparation(8). Infected hairs are seen to have a spore sheath surrounding the hair shaft and extending from the bulb for a short distance along the hair. The spores are about 1 micron in diameter and are crushed together in the sheath to form a mosaic pattern characteristic of infection by a microsporum (fig. 2). It is not possible to tell, however, which species of microsporum is causing the infection, since the microscopic appearance of the hair is the same regardless of the invading species.

Specific determination of the infecting organism is possible only by culturing infected hairs on Sabouraud's medium and noting the type of colony and spore forms produced. M. lanosum grows quickly, developing a white, cottony, aerial mycelium which becomes somewhat powdery and light brown in the center (fig. 3). When it is examined microscopically, numerous large, spindle-shaped spores are seen (fig. 4). M. audouini grows slowly, producing a matted, wooly colony with radiating furrows (fig. 5). Microscopically the large spores characteristic

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6. A simple Wood's light may be constructed by following the outline given in Lewis and Hopper's book(7), or a commercial Wood's light may be purchased from the Strobelite Company, New York, the Westinghouse Electric and Manufacturing Company, Long Island City, New York, Blaklite Products, Chicago, Aloe and Company, St. Louis, and other sources.

7. Lewis, G. M. and Hopper, M. E.: An Introduction to Medical Mycology, ed. 2, Chicago, Year Book Publishers, Inc., 1943.

8. Conant, N. F., et al.: Manual of Clinical Mycology, Philadelphia, W. B. Saunders, 1944.

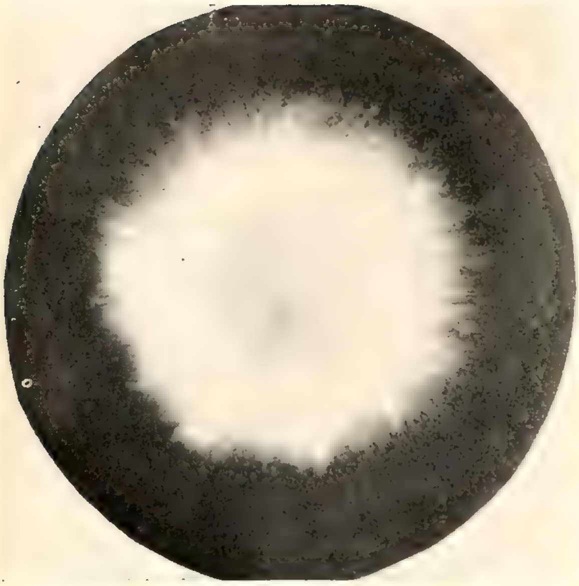

**Fig. 3. Culture of Microsporum lanosum.**

of M. lanosum are lacking, or are few and poorly formed. Identification of M. audouini is based usually on the type of colony growth and on the presence of raquette mycelium, pectinate hyphae, and nodular bodies seen in microscopic preparations.

Tinea capitis usually occurs in childhood and is rarely, if ever, found after puberty. The earliest lesion usually is seen as a small, scaling, erythematous papule perforated by a hair. Such papules spread peripherally to form patches. The hair becomes lusterless and brittle, breaks off easily, and becomes loosened so that it may be epilated readily. Alopecia usually develops in the infected areas. Since tinea capitis is very contagious, any scaling alopecia occurring in a child should be considered to be tinea capitis until proved otherwise.

### *Spread of Infection*

The most common modes of spread are by way of barber shops, motion picture theaters, schools, playgrounds, and homes. It has been demonstrated that combs, brushes, clippers, and scissors in barber shops sometimes contain infected hairs. Likewise, some theater seats have been found to contain infected hairs. When children play in schools and on playgrounds, they frequently wrestle together and wear one another's caps. At home an infected child may use the comb, brush, and hat of a non-infected child, or may sleep with him. Since there are so many possibilities for spreading infection in an epidemic of this kind, adequate control measures must be instituted at once and maintained over a long period of time.

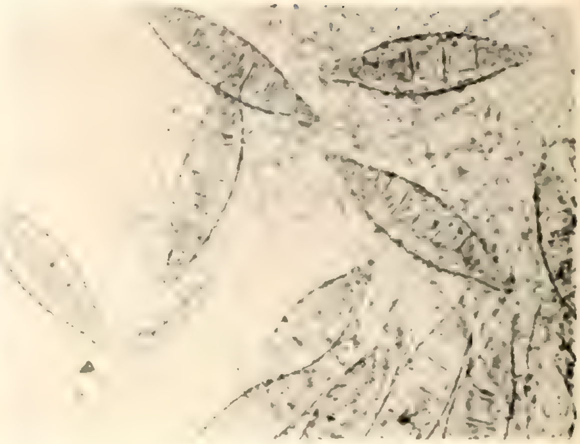

**Fig. 4. Photomicrograph of large spores of Microsporum lanosum**

### *Treatment*

At the outset it should be stated that if the infecting organism is M. audouini, x-ray epilation of the scalp will almost certainly be necessary. However, some reports on the use of local medication(2,3) are so promising that a trial treatment period is indicated. The following instructions may be given to each patient:

(1) Clip the hair as short as possible with scissors for at least 1 cm. surrounding the affected area as demonstrated by the Wood's light. Burn all clippings. The infected area may be delineated by painting around the infection with gentian violet or other suitable dye.
(2) Wash the scalp once daily with soap and hot water.
(3) Pluck all hairs in the involved area, daily.
(4) Apply the medication daily to all diseased areas, extending at least 1 cm. beyond each infected area. Once a week apply the medicament to the entire scalp.
(5) Wear a tight-fitting skull cap at all times, day and night, to prevent loosened infected hairs from coming in contact with other children. Wear a fresh cap daily. Boil the used skull cap for at least five minutes.
(6) Once a week wash the scalp with soap and water and apply no medication until the patient is examined clinically and under the Wood's light for evidence of activity.

*Medications used*

Medications used in the treatment of tinea capitis are legion. Schwartz and his co-workers(2) have found the following preparations most effective for local use:

(1) salicylanilide ointment
(2) copper undecylenate ointment
(3) pentachlorphenol ointment
(4) copper oleate ointment
(5) camphor phenol

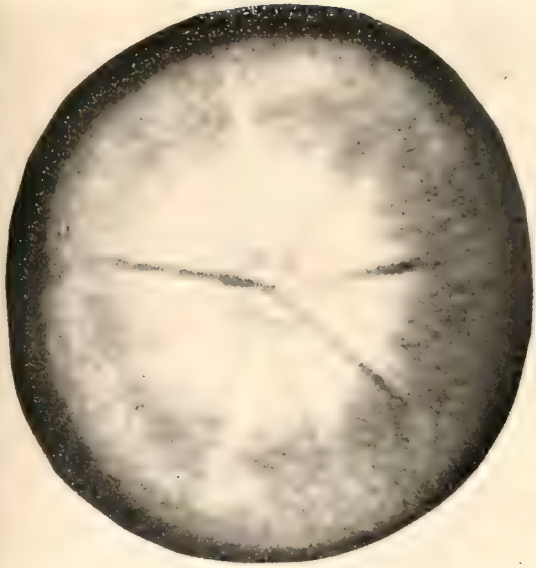

Fig. 5. Culture of Microsporum audouini.

Sodium propionate lotion, sodium propionate ointment, 5 per cent iodine ointment, 5 per cent ammoniated mercury ointment, and pragmatar ointment are other local preparations which may be extremely helpful in local management. The use of estrogenic hormone preparations locally, by mouth, or parenterally is to be condemned.

Miller and his associates(1b) feel that the success of local treatment depends more on the thoroughness of manual epilation than on the fungicide used.

*X-ray epilation*

If the infection has been proven to be caused by M. audouini, local treatment using one of the medications listed above according to the treatment regimen outlined should be carried out for two to three months. If at the end of that time there is no satisfactory improvement, x-ray epilation is indicated. Unfiltered x-ray therapy (300 r) through five portals according to the McKee technique should be given by a dermatologist or an expert roentgenologist. Roentgen therapy should be followed by manual epilation of any residual hairs, daily shampooing, and the application of medication according to the regimen used prior to x-ray treatment.

### *Conclusion*

Tinea capitis has already become a major public health problem in this state. It has appeared in epidemic form in the schools of Graham, and isolated cases have been seen in patients scattered all over the state. Any child showing alopecia or an inflammatory condition involving the scalp should be examined with the Wood's light and have microscopic examinations made of hairs from the involved area, and cultures for fungi. Isolation techniques and a therapeutic regimen similar to the one outlined should be instituted immediately. A survey should be made of children in the area to see if the infection is wide spread.

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# THE MANAGEMENT OF MYOCARDIAL INFARCTION

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The patient with a myocardial infarction so massive that death occurs within a few days in spite of all treatment need not be considered here, nor need we consider the unusual patient who has symptoms so mild that the evidence of infarction is picked up many months later by electrocardiographic tracing. There is, however, a large group of patients with moderate to severe symptoms whose recovery depends upon the treatment and clinical judgment of the physician in attendance. Because of the wide variation in the severity of the condition, no set routine of therapy can be followed. Each patient must be treated as an individual.

### *Management during the Critical Period*

Once the diagnosis of myocardial infarction is established, the one rule which seems safest to follow is to consider the patient in critical condition for a period of at least two weeks, no matter how mild the symptoms or signs may be. It is within this period that sudden death is most likely to follow from one of the complications, and it is best to caution members of the family of this possibility. Too much emphasis cannot be placed upon the psychologic management of the patient himself, however; usually he is already in fear of death, and any sign of anxiety in the physician or family will serve to terrorize him further. Such a statement should be superfluous; yet it is astonishing how freqently the physician himself is responsible for increasing the apprehension of the patient.

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### *Rest*

Bed rest is obviously necessary in the treatment of any patient with myocardial infarction. It is generally thought that four weeks is the minimum time required for the healing of even a small infarct, and that six weeks should be allowed for healing if it is thought that the infarction is reasonably large. After this period of time bed rest is not indicated save in the few patients actually in congestive failure.

Much discussion has arisen over the question as to whether or not the use of a bed pan is essential during the period of strict bed rest. At present the prevailing opinion is that, if the patient can use the pan without discomfort, he should do so; but that when the use of the bedpan becomes an ordeal and leaves the patient exhausted there may be actually less strain upon the myocardium if the patient is assisted to a bedside commode.

The use of the telephone for business calls should be rigidly prohibited, and ordinarily the patient should not use the telephone at all, except occasionally when a call from one of the family may be reassuring to him. Visitors should be excluded, except for members of the immediate family and close personal friends, and even these visits should be restricted to a few minutes. Good nursing care is essential in order to help the patient to carry out the restrictions. Members of the family may help as necessary, but should be under the direction of a competent nurse at all times.

The diet depends on the patient's condition. Usually during the first few critical days the food intake is restricted to fruit juices and milk. This diet may be prolonged through the first week, but usually during the second and succeeding weeks the patient is able to take a light diet. The important rules to follow are that the food be easily digestible and that the patient never overeat at any one meal. It is important to give the patient enough fluids, for in the few days following relatively extensive myocardial infarction there is more danger of his becoming dehydrated than of receiving too much fluid.

### *Medication*

Some opiate is indicated in nearly every case of myocardial infarction, not alone for the relief of pain but also for its effect in producing a certain amount of euphoria, or at least some relief from the feeling of apprehension. Pantopon can be substituted for morphine; often dilaudid is preferable to any other opiate because it so rarely causes nausea and vomiting. No definite rule can be given for the dosage of any of these drugs. If comparatively large doses fail to relieve the pain, the administration of massive doses is contraindicated; they seldom relieve the pain, and usually add to the anoxemia by depression of the respiratory center. The pain in coronary occlusion rarely persists more than two or three days, and after this period the opiates are generally of little value unless the patient is suffering from congestive failure and dyspnea which are not relieved by other medications. Demerol has not yet been used sufficiently to show its value in the acute stage of infarction, but should be tried where possible. It provides fairly effective relief of pain without depression of the respiratory center.

The more rapidly acting coronary dilators such as amyl nitrite are contraindicated; they not only fail to relieve pain and the local ischemia, but they serve further to reduce blood pressure, which often is dangerously lowered. There is evidence to show that after the patient has recovered from the acute shock of the occlusion, however, aminophyllin may favor the development of a collateral circulation and decrease the area of infarction. At present clinical evidence would seem also to favor the use of papaverine, which is devoid of all narcotic effect, but does cause dilatation of the coronary vessels. Aminophyllin is given preferably in the enteric-coated tablets in doses of 0.2 Gm. three or four times daily, and papaverine by hypodermic in doses of 64 mg. every four hours.

Glucose is of especial benefit during the first twenty-four or forty-eight hours after the onset of the attack. Not only does the patient's general condition improve, but often surprising relief from the pain is obtained. Some writers advocate the intravenous injection of 50 cc. of a 50 per cent solution of glucose by syringe, but it would seem better to give 100 cc. of 25 per cent glucose by slow intravenous drip. If there are evidences of much dehydration as a result of the profuse perspiration accompanying an infarction, larger doses of more dilute glucose may be used without danger, provided the drip is given slowly.

Digitalis is contraindicated. If the heart should respond with increased strength of contraction, the danger of rupture or aneurysm formation in the area of the softened muscle is increased. Furthermore, the action of digitalis in increasing cardiac irritability might lead to the development of serious arrhythmia. Later on, however, when healing is complete or nearly complete and when there is evidence of considerable decrease in cardiac reserve or of actual congestive failure, digitalis may be used without fear and with distinctly beneficial results. Quinidine at one time was employed frequently, and by some physicians routinely, in an effort to prevent the onset of ventricular tachycardia. In more recent years, however, its use has been restricted, and at present is usually limited to those patients showing numerous premature contractions as an evidence of increased ventricular irritability. Even in these cases it should be used with considerable caution and in doses not exceeding 0.2 to 0.4 Gm. every four hours day and night. There is evidence to show that atropine may help in the prevention of abnormal rhythms, and during the acute stages following infarction it may be used together with morphine. Large doses are contraindicated, however—both because of the resultant tachycardia, and because the dryness of the mouth makes the patient most uncomfortable, especially if fluids are restricted because of evidence of congestive failure.

Oxygen is of considerable benefit, especially in the patient who is cyanotic and in respiratory distress. Many patients are more comfortable psychologically when receiving oxygen by nasal catheter or in the oxygen tent, and become apprehensive when oxygen is discontinued. In such cases it is well to leave an oxygen tank at the bedside, as its presence seems reassuring to the patient. Other patients, however, react quite unfavorably to the use of oxygen, struggle against the nasal catheter, and feel apprehensive when placed in the tent. In such patients the restlessness and apprehension usually more than offset the benefit obtained by the use of oxygen.

In many patients following myocardial infarction the systolic blood pressure goes so low as to prevent glomerular filtration, and anuria results. The physician must differentiate between anuria and retention, so as to avoid catheterization when it is not indicated. Since the anuria is simply the result of a lowered blood pressure, diuretics will do no good during the acute failure. After the pressure has risen to normal, however, mercurial diuretics may be indicated if there is evidence of congestive failure. Often when the patient is not progressing well it is surprising how much diuresis can be obtained when there is no demonstrable pitting edema or obvious rales in the lung bases. Patients with congestive failure usually have albuminuria as a result of chronic passive congestion of the kidneys. This finding in itself is no contraindication to the use of the mercurial diuretics which, if necessary, may be repeated every two or three days. If satisfactory diuresis is not obtained by the mercurial diuretic alone, it is well to prepare the patient by giving 10 Gm. of ammonium chloride (usually 2 Gm. five times daily) for two days, and to administer the diuretic on the morning of the second day. Large doses of ammonium chloride often cause nausea and vomiting, and should not be given if good results can be obtained from the mercurial diuretic alone.

Emergency stimulants such as metrazol or coramine, although they are at times life saving, should be used with extreme caution, for the primary objective in the treatment of coronary occlusion is to give the weakened myocardium as much rest as possible. It is generally true that when such stimulants are needed at frequent intervals the area of infarction is so large as to make the prognosis hopeless. Mention should perhaps be made here of the use of caffeine. When the patient is able to take nourishment and is accustomed to a morning cup of coffee, there is no contraindication to its use; indeed, its mild diuretic action may be beneficial.

Mild sedation is indicated in nearly every case of myocardial infarction, especially in the aggressive, restless type of patient who rebels under the necessary restraint. Phenobarbital in doses of 30 mg. two or three times daily is helpful, but patients may complain that it makes them mentally sluggish. In such cases mebaral in doses of 0.1 Gm. two or three times daily should be given, as it causes mental relaxation without inducing a feeling of sluggishness. The dangers of overdosage are not great with either of these sedatives, and should symptoms of overdosage arise, they will subside promptly upon withdrawal of the drug. Bromides should be used with caution, especially since the salt intake is generally low and even therapeutic doses of the bromides may cause intoxication which may take several days to wear off. At bedtime some hypnotic may be necessary, and a wide variety of these medications are available.

The matter of elimination is often of more concern to the patient and the family than to the physician, who knows it is better for the patient to go four or five days without a bowel movement than to be worn out by the excessive use of laxatives or enemas. Sooner or later, however, some aid to elimination is necessary in practically all patients. Although the patient should not be permitted to dictate the medication he is to receive, it is often well to find out what laxatives have worked well in the past without causing excessive pain or discomfort. Some patients take enemas easily, in which case the water and glycerine enema is perhaps preferable to all others. If the patient reacts poorly to enemas, however, the use of a saline laxative is preferable. One should bear in mind that after four or five days fecal impaction may be present, and if the enema returns clear or if the laxative is ineffectual rectal examination is indicated immediately.

Since nearly every case of myocardial infarction is on the basis of coronary thrombosis, it would seem reasonable to use some anticoagulant to prevent further propagation of the clot to involve another branch of the coronary vessels. As yet, however, it seems imperative to restrict the use of dicumarol or heparin to patients who are in hospitals where daily determinations of the prothrombin time may be made. These preparations seem to offer great promise in the future, but overenthusiastic use without proper control is obviously unwise.

### *Management during Convalescence*

When the patient has passed the acute period of danger and is well on the way to recovery, it is well to explain to him why it is necessary to remain in bed for a further period of time in order to obtain good healing of the infarction. This explanation can be made without frightening the patient, and once he understands the need for the prolonged period of bed rest he will cooperate. The patient who is put off from day to day with vague promises will soon feel that the truth is being withheld, and will either become more and more apprehensive, or will conclude that the physician is an alarmist and will accordingly disregard his orders.

Throughout the period of convalescence some of the restrictions imposed during the first two weeks may be relaxed, and the patient may be allowed to have a few visitors each day, depending upon his condition. It is strange how otherwise intelligent people become insulted when refused admission to the room of a patient who has already seen his quota of visitors for the day. The one practical solution to this problem is to keep a daily list of visitors and, if necessary, make appointments in advance.

During the last week of absolute bed rest it is well to give light massage to the arms and legs to restore some measure of tone to the muscles, which have grown flabby through disuse. Active and passive movements of the extremities at various times during the day are also in order, provided the patient is in condition to carry them out.

When at long last the bed rest has terminated, it is time to start the patient on graduated exercises. These at the start may consist of nothing more than five minutes on the side of the bed, with the feet in a chair. The period should be extended gradually each day, depending upon the patient's response and general gain of strength. After he can sit up for thirty minutes, it is time to have him sit in a chair at the bedside. Obviously sitting in a chair is easier than sitting on the side of the bed, but at the start it is well to have the patient in bed, so that if he feels weak or dizzy he has merely to lie back in the bed. When he is able to sit up as much as thirty minutes in a chair, he should be allowed to sit up for this length of time twice daily. Each of these periods may be extended daily by fifteen to thirty minutes, depending entirely upon the patient's response. After a few days, he should start walking around the room.

### *Management after Recovery*

Finally the patient should venture outdoors for short walks gradually lengthened. Too much emphasis cannot be placed upon the fact that the only restriction ultimately will be the amount of exercise the patient finds he can take without substernal pain, oppression, shortness of breath, or other evidences of having exceeded the cardiac reserve. Only too often these patients are threatened with dire consequences if they walk more than short distances, whereas many of them actually can, by gradually increasing the walk, work up to five miles at a time. There is nothing quite so reassuring to the patient as the knowledge that he can live normally again. On the other hand, if the patient has to stop for breath every time he tries to go more than a short distance, it is unwise to try to push him beyond the limits of his cardiac reserve.

Many patients who have had coronary occlusions ultimately return to their work and recreation and live just as they did before; there is no reason to think that the patient will suffer any harm, provided he lives within the limits of his cardiac reserve.

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# THE TREATMENT OF CONGESTIVE HEART FAILURE

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The term "heart failure" implies the inability of the heart to maintain an output of blood adequate for body needs under conditions both routine and emergent. While two primary types of heart failure may be distinguished(1)—"forward failure" and "backward failure"—, features of both commonly coexist in either situation. The present paper will consider only the treatment of the second type—that is, congestive heart failure. This is the more frequent form, in which cardiac enlargement and congestion of the various body tissues predominate.

The management of congestive heart failure depends to a large extent upon the symptoms and signs indicating the cause and degree of failure. Each program of therapy must be individualized to meet the patient's particular needs. In general, however, therapeutic measures are directed toward reducing the work load upon the heart by rest, increasing its mechanical efficiency as a pump by digitalis, decreasing salt retention by diet, and promoting fluid excretion by diuretics. In the majority of instances a few simple rules are accepted.

## *Rest*

Physical rest, until compensation has been fully restored, is mandatory in order to reduce the demands for blood upon the already overburdened heart. Rest may be obtained in a comfortable bed with the head elevated, or in a large easy chair provided with arm rests. Rigid bed rest is not imperative and may be harmful, particularly if it is prolonged in elderly patients.

The judicious use of sedatives in the form of hypnotics (barbiturates) or narcotics (codeine, morphine, or dilaudid) promotes rest, relaxation, and sleep, and in addition, decreases dyspnea and cough. Narcotics, however, predispose to the development of Cheyne-Stokes respiration in the hypertensive and arteriosclerotic subject.

## *Diet and Fluid Intake*

Recent acquisitions to our knowledge concerning fluid dynamics in congestive heart failure(2) have served to reorient former opinions regarding diet and fluid intake(3). In the patient exhibiting edema, the most important part of the dietary regimen is restriction of sodium intake, for an excess of the sodium salt leads to fluid retention. When sodium in the diet is maintained at low levels, fluid restriction becomes unnecessary, for large amounts of fluid are well tolerated by the patient(4). When fluids are restricted below 1500 cc. per day, thirst is common. By contrast, when fluids are forced beyond 3000 cc. orally, abdominal discomfort is frequent. The most sensible program would seem to be to allow the patient fluids in accordance with his own desires. It may be necessary to urge certain individuals to take 2000 to 2500 cc. of fluid per day in order to insure adequate urinary excretion. The average diet contains 4 to 12 Gm. of sodium chloride, but diets very low in sodium may be attained simply by proper selection of foods, the use of salt-free bread and butter, and the omission of salt in cooking. The restriction of sodium to levels of .5 to 1 Gm. per day may achieve brilliant results in patients with chronic and recurrent heart failure.

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From the Department of Medicine, Duke University School of Medicine, and Duke Hospital, Durham, North Carolina.

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4. Schroeder, H. A.: Studies on Congestive Heart Failure. I. The Importance of Restriction of Salt as Compared to Water, Am. Heart J. 22:141-153 (Aug.) 1941.

Initially, an adequate caloric intake is relatively unimportant. The diet should be light, nutritious, and high in carbohydrates, but low in salt content. The modified Karell diet(5) or the ordinary cardiac "soft" diet, with four to six feedings per day, is satisfactory. As the patient improves, a gradual shift may be made to a bland diet low in total sodium. Because protein and vitamin deficiencies are likely to occur in the chronic cardiac patient with longstanding and recurrent failure, these deficiencies must be corrected. The protein intake should range between 50 and 70 Gm. per day. Since a manifest single vitamin deficiency is uncommon, the diet should be supplemented with one of the multi-vitamin preparations, given either orally or parenterally.

A new approach(6) to the therapy of heart failure employs a neutral or slightly acid ash diet containing 0.85 Gm. of sodium supplemented by hydrochloric acid and ammonium chloride orally for purposes of acidification. The rationale is based upon the theory that the excretion of sodium is favored by the acidifying program. In addition, fluids are forced to levels varying from 3000 cc. to 8000 cc. per day, by both oral and parenteral routes, in order to combat thirst and dehydration and to promote diuresis. This regimen has not been accepted generally, except in modified form.

### *Diuretics*

Diuretics are useful adjuvants to therapy. By promoting the excretion of fluid by the kidney, they reduce the blood volume, venous pressure, and tissue edema. The xanthine diuretics presumably act by increasing renal blood flow and renal filtration. The oral preparations of this group consist principally of theophylline and theobromine and their related salts. Theophylline and its derivatives are more effective than the theobromines, but tend to evoke nausea and vomiting more easily. These drugs should be administered in the maximum tolerated dosage, preferably divided equally in three or four doses a day to avoid gastric irritation. The average range of daily dosage which is usually well tolerated is as follows: theophylline, 0.6 to 0.9 Gm.; theophylline sodium acetate, 1 to 2 Gm.; theophylline ethylenediamine (aminophyllin), 0.3 to 0.6 Gm. (enteric coated); theophylline calcium salicylate (phyllicin), 0.6 to 0.9 Gm.; theobromine, 0.9 to 1.8 Gm.; theobromine sodium salicylate (diuretin), 2.6 to 4 Gm.; theobromine calcium salicylate (theocalcin), 1.5 to 3 Gm.; and theobromine sodium acetate, 1.5 to 3 Gm. Less nausea and vomiting result, and probably equal therapeutic effect is obtained if these drugs are administered for a period of one or two days, then omitted for an equal length of time. Aminophyllin may be given in the form of rectal suppositories (0.25 to 0.5 Gm.) or intravenously (0.24 Gm. in 50 cc. of fluid, 0.48 Gm. in 100 cc. of fluid), both for its diuretic effect and for its bronchodilating action, which relieves dyspnea. Caution must be observed when the drug is given intravenously (always slowly and through a small needle), for in some instances reactions of the collapse type may occur in patients with serious, acute myocardial damage (infarction) or severe congestive heart failure.

The mercurial diuretics unquestionably are the most potent diuretics now available, and they owe their action to a direct effect upon the renal tubules which inhibits the reabsorption of fluid. Probably the best known and most widely used mercurials are salyrgan combined with theophylline, and mercupurin, both of which contain mercury and theophylline. The addition of the xanthine enhances the diuretic effect of the mercurial. The best effects are obtained by the intravenous administration of these drugs, beginning with 0.5 cc. and increasing gradually to a maximum of 2 cc. Subsequent doses may be administered at intervals of two days to a week. Salyrgan and mercupurin produce pain when given intramuscularly, and cause necrosis in the skin and subcutaneous tissues. A new mercurial, mercuhydrin, is suitable for intramuscular injection at similar dosage levels. The urine must be watched carefully for albumin and cellular elements denoting a deleterious effect upon the kidney. The effectiveness of the mercurial drugs may be increased materially by the preliminary administration of such acidifying salts as ammonium chloride or ammonium nitrate, 4 to 6 Gm. daily, given in enteric-coated pills (0.5 Gm.) in divided doses three or four times daily.

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5. Bannick, E. G. and Smith, F. H.: The Karell Diet and a Modified Karell Diet in the Treatment of Cardiac Dropsy, J. Am. Dietet. Assoc. 2:246-249 (March) 1927.
6. Schemm, F. R.: A High Fluid Intake in the Management of Edema. Especially Cardiac Edema. I. The Details and Basis of the Regime, Ann. Int. Med. 17:952-969 (Dec.) 1942; II. Clinical Observations and Data, Ann. Int. Med. 21:937-976 (Dec.) 1944.

### *Digitalis and the Cardiac Glycosides*

Digitalis is the most effective single therapeutic agent in the treatment of heart failure. In most instances the oral administration of the whole digitalis leaf (representing a mixture of glycosides) in tablet form is satisfactory, simple, and effective(7). The average digitalizing dose may be roughly calculated as 0.1 Gm. of digitalis (1 U.S.P. XII unit) for each ten pounds of body weight. Thus, between 1 and 2 Gm. of digitalis (10 to 20 U.S.P. XII units) is necessary for complete digitalization. This amount should be prescribed in divided doses over a period of several days in order to prevent gastrointestinal irritation or the development of rapid intoxication. Digitalis should be continued until some effect, whether therapeutic or toxic, is noted. The rapidity of its administration will vary with the needs of the individual case. Since digitalis is excreted at a rate of approximately 0.1 to 0.15 Gm. per day, this amount should be given as a maintenance dose and continued indefinitely, even after full compensation has been restored. When the oral route is not feasible, digifolin may be used intramuscularly; it should be remembered, however, that only one-third to one-fifth as much in terms of U.S.P. units will be required for parenteral as for oral digitalization.

The most significant advance in digitalis therapy(8) is the recent introduction of the purified principles of digitalis leaf, the cardiac glycosides, to which digitalis leaf preparations owe their action. The most important member of this group is digitoxin, which, assayed gravimetrically, has a potency 1,000 times as great as that of digitalis; for example, 0.1 mg. of digitoxin is equivalent in potency to 0.1 Gm. of digitalis. Digitoxin is unique among the digitalis group, in that it is wholly absorbed when given orally; thus the dose required for complete digitalization is the same, whether the drug be given orally or intravenously(9). The average digitalizing dose of the drug is 1.2 mg.; this may be administered as a single dose with little evidence of intoxication, but preferably is divided into two equal portions given at six-hour intervals. The maintenance dose is 0.1 to 0.2 mg. daily. Since digitoxin is excreted as slowly as digitalis leaf, a shift from intravenous digitalization to oral maintenance is made without difficulty.

The physician should familiarize himself with two other preparations for even more rapid intravenous digitalization. Ouabain (crystalline G-strophanthin) exerts early effects in ten to twenty minutes; its maximal action is reached in two hours. A safe initial intravenous dose is 0.5 mg., but caution is required for subsequent injections of 0.1 mg. at hourly intervals, never to exceed a total dosage of 0.9 mg. The dosage of lanatosid C, also a useful intravenous preparation, is 1.6 mg. given in two equal parts at intervals of four hours. Because ouabain and lanatosid C are excreted rapidly in forty-eight to seventy-two hours, maintenance doses are judged with difficulty, and a transfer to oral digitalis leaf (or digitoxin) is customary at the end of twenty-four hours. Intravenous digitalization is rarely necessary and should never be proposed for a patient who has received digitalis recently in other forms.

### *Other Therapeutic Measures*

Oxygen inhalation therapy in concentrations of 100 per cent is of value when arterial unsaturation leading to cyanosis is present. It has been recommended, particularly in coronary artery thrombosis, to increase the amount of oxygen available to the myocardium. Stimulants such as caffeine, coramine, and metrazol are of value for the relief of Cheyne-Stokes respiration. The withdrawal of 500 to 700 cc. of blood by venesection is useful when the venous pressure is high.

Paracentesis of the thorax may be performed for relief of dyspnea whenever the amount of fluid to be removed is greater than 500 cc.; abdominal paracentesis may be done whenever it seems probable that 1500 to 2000 cc. of fluid will be withdrawn. However, paracentesis removes body proteins, and if it seems likely that the patient will absorb his own cavity fluid, such loss of protein should be avoided. The use of Southey tubes to drain local tissue edema in the lower extremities or in the scrotum is valuable in some cases, but great care must be exercised, lest the tissue become infected.

Emergency treatment may be necessitated by sudden failure of the left ventricle, which

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7. Brome, R. A., Jr. and Orgain, E. S.: The Practical Use of Digitalis, North Carolina M. J. 7:3-8 (Jan.) 1946.
8. (a) Gold, H.: Pharmacologic Basis of Cardiac Therapy, J.A.M.A. 132:547-554 (Nov. 9) 1946.
   (b) Freedberg, A. S. and Zoll, P. M.: Digitalis, New England J. Med. 235:938-945 (Dec. 26) 1946.
   (c) Broome, R. A., Jr. and Orgain, E.S.:The Cardiac Glycosides, North Carolina M. J. 7:61-65 (Feb.) 1946.
9. The cardiac glycosides should not be given subcutaneously or intramuscularly because of local irritation.

produces acute pulmonary edema associated with great anxiety, intense dyspnea, orthopnea, and cardiac asthma. In most instances morphine, 15 mg., combined with atropine, 0.6 mg. subcutaneously, and aminophyllin, 0.24 to 0.48 Gm., given slowly by vein will suffice to abort the attack. However, rapid intravenous digitalization with a cardiac glycoside may be imperative and life saving. The application of cuffs around all four extremities to induce peripheral stasis will delay the venous return of blood to the lungs. If the venous pressure is high, 500 to 700 cc. of blood may be withdrawn rapidly by venesection to decrease pulmonary congestion. The inhalation of oxygen in 100 per cent concentration by tent, mask, or catheter combats anoxemia and relieves dyspnea.

### *Prophylactic Measures*

When the phenomena associated with congestive heart failure have disappeared and compensation has been restored, the patient may be allowed to resume slowly a program of limited activity compatible with an asymptomatic existence. The body weight must be stabilized at normal or substandard levels. Respiratory infections, particularly, should be avoided and treated with unusual care. Recurrent episodes of heart failure can be curtailed effectively by the intelligent use of rest and sedation, a diet low in sodium content, the maintenance of full digitalization, and the frequent administration of diuretics, particularly the mercurials, in order to prevent or to relieve latent fluid retention.

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# TREATMENT OF CARDIAC FAILURE WITH THE RICE DIET

## *History of a Patient with Myocardial Aneurysm*

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DURHAM

In a large number of patients with kidney disease and hypertensive cardiovascular disease treated with the rice diet, the enlarged heart became smaller, the inverted $T_1$ became upright, and the signs and symptoms of cardiac failure disappeared(1). The rice diet has also proved beneficial in patients with cardiac failure due to other causes (aortic and mitral valvular lesions, auricular fibrillation, left bundle branch block, and so forth).

The diet contains in 2000 calories not more than 200 mg. of chloride and 150 mg. of sodium. The daily fluid intake is, in most instances, not more than 800 cc. In patients who have no sodium chloride retention at the beginning of the rice diet and no "renal leakage" of sodium chloride, the urinary chloride concentration after two months on the diet is about 10 mg. per 100 cc., the sodium concentration about 1 mg. per 100 cc.; the sodium-potassium ratio in the urine is about .003 (compared with 2 on a "normal" diet).

The history of a patient with myocardial infarction followed by myocardial aneurysm is given as an example of the effect of the rice diet in cardiac failure.

### *Case Report*

M. C. (B85425), a 45-year-old white county farm agent, was admitted to Duke Hospital August 5, 1946.

*History*: The patient's father died at 54 of heart trouble; his mother died at 58 of a stroke. The patient's general health had always been very good except for increasing obesity. "Hypertension and overweight" (250 pounds) forced him "to take it easy since the spring of 1944."

In April, 1945, the patient suddenly developed fever and dizziness, and was sent to a hospital. He was unconscious for several hours and "out of his head for some time afterwards." The systolic blood pressure, which according to the patient had been around 200, fell to 140. There was no precordial pain at any time. The fever persisted for two weeks. At discharge, he was advised to rest and to take digitalis.

In June, 1945, the patient developed "fluid in his chest," dyspnea, and orthopnea. The systolic blood pressure was 150. In August, 1945, for two weeks, he was treated in another hospital with oxygen, a low-protein, salt-poor diet, and ammonium chloride. He felt better and was able to be up and about. In November, 1945, albumin (2 to 4 plus) and casts were found in the urine. Ascites and ankle edema began. From January, 1946 on, his condition grew steadily worse, the dyspnea causing the greatest discomfort. For five days in May, 1946, he felt mentally confused. About the same time, he developed

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From the Department of Medicine, Duke University School of Medicine, Durham, N. C.

1. Kempner, W.: (a) Treatment of Kidney Disease and Hypertensive Vascular Disease with Rice Diet, North Carolina M. J. 5:125-133 (April) 1944; (b) Compensation of Renal Metabolic Dysfunction, North Carolina M. J. 6:61-87 (February); 117-161 (March) 1945; (c) Some Effects of the Rice Diet Treatment of Kidney Disease and Hypertension, Bull. New York Acad. Med. 22:358-370 (July) 1946.

a decubitus ulcer over the coccyx. Since June, he had had considerable soreness of the tongue.

He was under medical care during all this time, and between January and July, 1946, he spent one hundred and twenty-six days in three different hospitals. In addition to digitalis for more than a year (1.7 grains of digitora daily since June 15, 1946) and a salt-poor diet, he was given salyrgan (seven injections since May 15, 1946), aminophyllin (twelve injections since May 15, 1946) and glucose intravenously, and ammonium chloride (3 to 6 Gm. daily from August 30, 1945, to May 15, 1946), theominal, coramine, barbital, and other sedatives.

In spite of this treatment, the cardiac failure increased. On July 29, a paracentesis was done and 2 gallons of fluid were removed, but a week later the abdomen was swollen as much as before and the edema had become worse.

*Physical examination* (August 5, 1946): The patient's weight was 187 pounds, height 5 feet, 10 inches, temperature 37 C. (98.6 F.), pulse 86, respiration 16. His blood pressure during the first week averaged 126 systolic, 88 diastolic. He was a well developed, poorly nourished, white man in considerable respiratory distress. There was generalized anasarca, and the skin was pale. Over the coccyx was a decubitus ulcer measuring approximately 1 inch in diameter. The eyes had a marked stare; the eyegrounds showed only slight tortuosity of the vessels. The tongue was very red, smooth, and sore, and along the lateral margins were several ulcers. There was engorgement of the neck veins, and rales were heard at both lung bases.

The heart was markedly enlarged, chiefly to the left. The maximum apical impulse was in the fifth interspace 14 cm. from the midsternal line. The sounds at the base were forceful, and the second pulmonic sound was louder than the second aortic. The first sound at the apex was weak and was followed by a loud, long, blowing systolic murmur. During the period of this murmur, a high-pitched murmur of shorter duration was heard.

The abdomen was large, round, distended, and filled with fluid. A non-tender liver edge was felt 6 cm. below the costal margin. There was marked sacral and scrotal edema and severe pitting edema of the ankles and legs.

*Accessory findings*: The chest film showed a slight increase in the markings at both lung bases. The heart appeared enlarged, especially to the left, and there was an area of increased density along the left border of the heart that was thought to be due to a myocardial aneurysm (Dr. J. G. Whildin). Further x-ray studies by fluoroscopy and films (Drs. G. Baylin and R. J. Reeves) confirmed the presence of a myocardial aneurysm of the postero-lateral wall of the left ventricle (fig. 1).

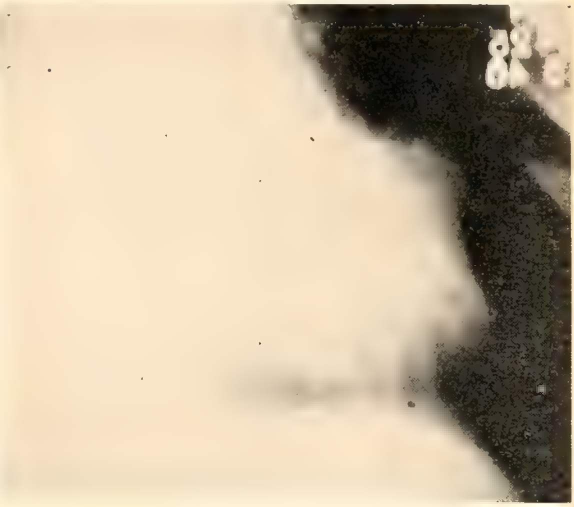

**Fig. 1**

As is shown in table 1, the electrocardiogram showed right axis deviation; the venous pressure was increased, the renal reserve was diminished, and hypoproteinemia, hypocalcemia, and albuminuria were present.

*Impression*: Myocardial aneurysm following myocardial infarction. Advanced myocardial failure.

*Course*: On August 7, the patient was started on a 2600-calorie rice diet with 800 cc. of fruit juices, supplemented by vitamins A, B, C, and D, and ferrous sulfate (0.6 Gm. three times a day). All other medication was discontinued except digitalis (1 cat unit of digifolin daily), and oxygen inhalation.

A paracentesis was done on the ninth hospital day; 8000 cc. of fluid were removed. Four days later, the patient had a chill and fever. The temperature became normal twenty-four hours after treatment with penicillin was started.

The patient ate the diet well; it was increased to 2900 calories on August 30, and to 3100 calories on October 16.

By the end of the fifth week, his weight

### Table 1

### Accessory Findings

| | Aug. 5-12, 1946 | Oct. 29-Nov. 18, 1946 |
|---|---|---|
| Blood pressure (mm. Hg.) | 126/88 | 100/70 |
| Hemoglobin (percent. of 15.5 Gm.) | 86 | 85 |
| Red blood cells | 4,200,000 | 4,400,000 |
| White blood cells | 6,100 | 7,000 |
| Nonprotein nitrogen (mg. per 100 cc. of blood) | 32 | 23 |
| Urea nitrogen (mg. per 100 cc. of blood) | 12.9 | 7.9 |
| Urea ratio (percent.) | 40.3 | 34.3 |
| Sugar (mg. per 100 cc. of blood) | 87 | |
| Total proteins (Gm. per 100 cc. of plasma) | 5.7 | 7.1 |
| Globulin (Gm. per 100 cc. of plasma) | 2.9 | 3.4 |
| Albumin (Gm. per 100 cc. of plasma) | 2.8 | 3.7 |
| Albumin-globulin ratio | 1.04 | 0.91 |
| Calcium (mg. per 100 cc. of serum) | 7.2 | 8.5 |
| Phosphorus (mg. per 100 cc. of serum) | 3.9 | 4.2 |
| Cholesterol (mg. per 100 cc. of serum) | 160 | 140(Sept.5) |
| Chlorides (as mg. NaCl per 100 cc. of plasma) | 616 | 584 |
| Phenolsulfonphthalein (percent. excreted in 2 hours) | 41 | 50 |
| Urea clearance (percent. of normal) | 9.9 | |
| Mosenthal (concentration-dilution) test | 1.019-1.024 | |
| Urine albumin (Gm. per 1000 cc.) | 0.85 | 0.06 |
| Urine chlorides (as mg. NaCl per 100 cc.) | 429 | 26 |
| Total nitrogen excreted in urine in 24 hours (Gm.) | | 2.75 |
| Basal metabolic rate (percent.) | +21 | +5 |
| Electrocardiogram | | |
| T waves | $T_1$ isolectric, $T_{2,3}$ flat, $T_4$ inverted, $ST_{2,3}$ depressed. | $T_{1,2,3}$ more upright. $ST_3$ depressed. $T_4$ upright. |
| Angle of electrical axis (degrees) | +106 | +95 |
| Venous pressure (mm. of saline) | 185 | 70 (Oct. 3) |
| Transverse diameter of heart (cm.) | 19.75 | 17.15 |
| Diameter of great vessels (cm.) | 8.85 | 6.3 |
| Weight (Kg.) | 85 | 64.1 |
| Liver enlargement (cm. below costal margin) | 6 | 0 |
| Circumference of abdomen, at umbilicus (cm.) | 110 | 83 |
| Circumference of each leg, 7 cm. above lateral malleolus (cm.) | 25 | 20.5 |

had decreased from 85 Kg. (187 pounds) to 67 Kg. (148 pounds). The urine volume was regularly greater than the fluid intake. Most of the edema had disappeared, and the liver was smaller in size. The decubitus ulcer had healed. The total plasma proteins had risen from 5.7 to 6.2 Gm., the plasma albumin from 2.9 to 3.4 Gm. per 100 cc.

Although the venous pressure had not decreased (192 mm. of saline on September 7 compared with 185 mm. on admission), digifolin was discontinued on September 10. Some respiratory distress persisted for another two weeks, but gradually subsided.

Because the tongue had remained sore and some ulcers on the margin were still present, 25 mg. of folic acid by mouth were given daily from September 26 to November 7. After the middle of October, the tongue no longer caused any discomfort.

By the end of October, edema and liver enlargement had completely disappeared. The heart was smaller, and the venous pressure was normal. The urinary albumin had decreased from 0.85 to 0.07 Gm. per 1000 cc.; the total plasma proteins had risen to 7.1 Gm. per 100 cc. The patient felt well and was able to take short walks without dyspnea or fatigue.

The weight, which had dropped to 62 Kg. (137 pounds) on October 2, remained constant for one month and then gradually rose. By November 21, it was 64.5 Kg. (142 pounds).

The amounts of chloride and sodium excreted in the urine had decreased very slowly (tables 2 and 3). In the eighth week after the rice diet was begun, the chloride concentration was 66.5 mg., the sodium concentration 32 mg. per 100 cc. of urine. The sodium-potassium ratio in the urine was 0.18. In the fifteenth week, the chloride concentration was 15.2 mg., the sodium concentration 1.3 mg. per 100 cc. of urine. The sodium-potassium ratio in the urine was 0.006.

The patient returned home on November 21. He was advised to continue the rice diet, to which one ounce of meat twice a week was added. Fluids were limited to 750 cc. per day.

**Table 2**

**Urinary Chloride Concentration**

| *Week of Rice Diet (Diet started Aug. 7, 1946)* | *Mg. Chloride in 100 cc. of urine (averages)* |
|---|---|
| 6th | 81.7 |
| 7th | 88.3 |
| 8th | 66.5 |
| 9th | 57.5 |
| 10th | 35.2 |
| 11th | 26.6 |
| 12th | 18.7 |
| 13th | 17.0 |
| 14th | 18.8 |
| 15th | 15.2 |
| 16th | 15.7 |

**Table 3**

**Concentrations of Sodium, Potassium, and Chloride in Blood, Serum, and Urine**

|  | *Eighth week of diet (Sept. 28, 1946)* | *Fifteenth week of diet (Nov. 18, 1946)* |
|---|---|---|
|  | *milli-equivalents per liter* |  |
| Sodium: |  |  |
| blood | 84.3 | 81.7 |
| serum | 139.7 | 142.2 |
| urine | 13.9 | 0.57 |
| Potassium: |  |  |
| blood | 46.2 | 50.0 |
| serum | 4.8 | 5.3 |
| urine | 45.0 | 57.2 |
| Chloride: |  |  |
| blood | 84.0 | 79.3 |
| serum | 94.2 | 100.0 |
| urine | 14.0 | 4.1 |

## *Summary*

The history of a patient with myocardial aneurysm following myocardial infarction is given. He was admitted to Duke Hospital in advanced cardiac failure with marked sodium chloride retention. For a period of seven months, four of which the patient spent in various hospitals, he had been treated with salt-"poor" diets, digitalis, ammonium chloride, theominal, aminophyllin, salyrgan, and a paracentesis. In spite of this treatment, the cardiac failure had become progressively worse and the patient had developed severe dyspnea, generalized anasarca, cardiac enlargement, liver enlargement, ascites, albuminuria, hypoproteinemia, hypocalcemia, and a decubitus ulcer. In five weeks of treatment with the rice diet, supplemented by vitamins and iron, the patient improved so much that digitalis, the only medication that had been continued, could be stopped. In nine more weeks, during which the patient was given no treatment except the rice diet, vitamins A, B, C, and D, folic acid, and iron, all signs and symptoms of cardiac failure disappeared.

# A BASIS FOR THE TREATMENT OF RHEUMATOID ARTHRITIS

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The diagnosis of rheumatoid arthritis means, too frequently, that the patient leaves the office of his physician with an attitude of uncertainty toward his future which, in this disease perhaps more than in any other, is prejudicial to his welfare. Vague and indefinite remarks as to possible causes and treatments can easily add to the worries of one whose burdens are already heavy. The physician should recall the maxim of Oliver Wendell Holmes: "Give your patient the benefit of your knowledge; keep your doubts to yourself." A confession of ignorance often offers a more substantial basis for therapy than that derived from an edifice of doubtful theories. The fact that our present knowledge of specific causative agents and mechanisms in arthritis is extremely limited does not mean that the physician can offer nothing to the patient. There are many classical examples—typhoid fever and tuberculosis might be cited—of diseases which were recognized from purely clinical findings by several generations of physicians before the chief etiologic agent was discovered.

A review of the various classifications of arthritis published during recent years(1) reveals that their bases are largely descriptive and that there are many unknown factors in those instances where the cause of the joint disease is classified as *known*. Bauer's(2) classification, which is the broadest and most practical, insists on "a detailed medical history and a complete physical examination" and warns against "the patient's diagnosis of rheumatism or arthritis." Then the clinician must decide whether previous injury to the joint is important enough to place the affection in the class of *known etiology (traumatic)* or whether it belongs in the class of *unknown etiology*, either as *secondary degenerative joint disease* or as *atypical rheumatoid (proliferative or chronic infectious) arthritis*. The emphasis on descriptive criteria is exemplified by the statement:

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1. Hench, P. S. et al.: The Present Status of the Problem of "Rheumatism": a Review of Recent American and English Literature on "Rheumatism" and Arthritis, Ann. Int. Med. 8:1315-1374 (April); 1495-1555 (May) 1935.
2. Bauer, Walter: The Diagnosis of the Various Arthritides, New England J. Med. 221:524-533 (Oct. 5) 1939.

"If one will allow for the passage of time before making an absolute diagnosis, the true nature of the type of arthritis present will become all too apparent." This statement refers to the differences between *atypical* and *typical* rheumatoid arthritis.

Such statements and classifications, the products of careful studies and analyses by groups of experienced clinicians, are discouraging if one expects to offer his patients a specific treatment for every complaint. To the physician who recalls that the practice of medicine is an art requiring his particular skill in assisting a patient to face the unknown, the problem of rheumatoid arthritis is a challenge. There is no real basis for pessimism, and it is clear that many advances in the treatment of arthritis have been made during the last decade, when students of the disease have emphasized their failures to accumulate proof for the theory of focal infection(3). This theory, first propounded in 1912(4), is often foremost in the mind of the patient, but after some twenty-five years of enthusiastic testing it has not been substantiated as an adequate explanation of rheumatoid arthritis. Other scarcely less publicized theories and quasi-specific treatments such as colonic irrigation, vaccines, sulfur, and super-irradiated sterols also have failed to meet the tests of controlled studies.

### *The Advantages of Taking the Patient into One's Confidence*

It now seems that the best approach to treatment is that in which the physician gives more thought to the advantages of taking the patient into his confidence, so that they together can face and work out the problems presented by a disease of unknown cause. The physician usually will find that he has made a friend. Arthritics lead a lonely life. They are—or occasionally fancy themselves to be—mainstays of their families, and of many community and business activities. Being perfectionists, they often have formed the habit of driving themselves, tending to compete with their own ideals rather than with their contemporaries. They are seldom overly sensitive about their joint deformities, and they seem to resent the handicap to their projected activities more than the pain and anatomic changes associated with their disease. They continuously fight disability and welcome an ally in the battle. They never willingly relinquish the management of their own condition and are quite sensitive to the attitude of a physician who initiates a transiently beneficial type of treatment in the hope that another physician will be consulted for the next exacerbation. Such features of the arthritic's personality often are so outstanding that the family physician, who recognizes both these attributes and the presence of rheumatoid arthritis, may find it wise to postpone a detailed discussion until the patient has accumulated enough experience to be receptive.

A second advantage to the physician of taking the patient into his confidence will be an altered attitude on the part of the patient. His feeling that the medical profession is withholding beneficial treatment, because some acquaintance has been "cured" by this or that removal or injection, will be removed. The patient's identification of himself or herself with the thousands of fellow-sufferers who are being helped to overcome other diseases for which no specific treatment is available is a step toward improvement. In this way the patient often can be induced to assume an attitude similar to that of a tuberculous patient who is being treated in the home. He may come to appreciate that, in compensation for his pain, his disease allows him some activity and does not carry the risk of infection to others.

The greatest advantage is that a state of uncertainty, incompatible with any type of contentment in life, can be changed to a much more satisfying philosophy if our available knowledge of the disease is presented properly to the patient. Much of the dissatisfaction of present-day sufferers from arthritis arises from the false hopes engendered by the enthusiastic attitude of a previous generation of the medical profession toward the theory of focal infection, and by their belief that "the cause can be found." Patients can be made to understand that such studies have increased our knowledge of the disease to a certain point, and that we must now consider the unknown factors in the patient himself.

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3. Cecil, R. L. and Angevine, D. M.: Clinical and Experimental Observations on Focal Infection, with an Analysis of 200 Cases of Rheumatoid Arthritis, Ann. Int. Med. 12: 577-584 (Nov.) 1938.
4. Billings, Frank: Chronic Focal Infections and Their Etiologic Relations to Arthritis and Nephritis, Arch. Int. Med. 9:184-198 (April) 1912.

### *Therapy Based on the Factor of Resistance*

Once the existence of an unknown factor in the causation of rheumatoid arthritis is accepted, it is apparent that there must be inherent in the human body an almost equally potent antagonistic factor. The rapid return to a normal or quiescent stage, frequently seen after the removal of some burden which the patient has been carrying, often parallels the responses seen after the institution of an equally non-specific rest therapy in pulmonary tuberculosis. The fact that a few patients with tuberculosis show only slight evidences of resistance to the infection and grow steadily worse should not discourage the institution of a positive plan of treatment, with assurance to the patient that beneficial results are expected. Similarly, those instances in which the rheumatoid arthritis progresses inexorably from joint to joint should not blind us to the strong recuperative tendencies evidenced in a large proportion of patients having the disease.

This simple concept that there is present in the human body some definite mechanism of resistance to arthritis, analogous to that responsible for the arrest of tuberculosis, is the outstanding feature which should be presented to a patient in instructing him about his disease. Such a concept can be derived rationally only if one starts with the premise that the arthritis is of unknown cause and that no form of treatment can be regarded as specific. On such a basis, a plan of therapy for both the patient and the physician is clarified.

### *Teaching the patient the art of living*

For three or four centuries experienced physicians have emphasized the need, in prevention and in treatment of chronic diseases, for the patient to learn and the physician to teach the art of living. The sufferer from arthritis most often becomes an eager pupil, and his physician should make a real effort to qualify as a teacher. He can do so only if he is willing to familiarize himself with the personal history(5) as well as the medical history of his patient and to take almost infinite pains in evaluating the relative importance of emotional and situational burdens, in addition to those implied by the presence of active local infections, handicaps to locomotion and proper posture, and undesirable habits of diet, work, sleep, and the like. The importance of "a different point of view on the part of both physician and patient"(6) in the treatment of chronic disease has been emphasized repeatedly(7). Too great emphasis cannot be placed on the fact that, in treating arthritis, it is the physician's responsibility, as it always has been, to assist his patient to face the unknown.

When it is clear that the aim of treatment is to assist, in every way possible, those unknown but natural factors of resistance which are able to produce quiescence or arrest in the arthritic process, the relative importance of different features of the treatment can be estimated. In some instances it may appear that infection in the tonsils should be given precedence; in others the need for more sleep or a better bowel routine may seem to be of the greatest importance. Some patients need rest; others would be harmed by what that word implies, but are more in need of repose in the sense of peace of mind. Many need, more than anything else, the relief of pain and assurance of improvement of their deformities and disabilities which modern orthopedic and physical medicine can offer. Every patient needs the continued interest of a physician who will encourage a mode of life which is planned to prevent any type of depletion.

### *Non-specific therapeutic measures*

Under circumstances in which a maximum effort to improve all features of the patient's life is being made, there would seem to be a place for trial of some of the non-specific measures which have been credited with promoting remissions. Therapy with gold should not be offered until the patient is capable of understanding its place in the scheme of treatment, but a remission in association with chrysotherapy may simplify the many other adjustments which are necessary to encourage both patient and physician in further efforts aimed at the more difficult problems.

## *Summary*

If careful and complete diagnostic studies fail to reveal an obvious and satisfying cause for an arthritic manifestation, it is often

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5. Heath, C. W.: An Interview Method of Obtaining Personal Histories, New England J. Med. 234:251-257 (Feb. 21) 1946.

6. Ropes, M. W. and Bauer, W.: Rheumatoid Arthritis: Its Various Clinical Manifestations, New England J. Med. 233:592-596 (Nov. 15); 618-623 (Nov. 22) 1945.

7. (a) Minot, G. R.: General Aspects of the Treatment of Chronic Arthritis, New England J. Med. 208:1285-1290 (June 22) 1933.
   (b) Pemberton, Ralph: Developments in Arthritis, Am. J. M. Sc. 209:364-382 (March) 1945.

best to regard the disease as one of unknown cause and to explain this concept to the patient in such a way that he will not persist in searching for a specific remedy. This explanation is important in teaching a patient to adjust to the local handicaps of degenerative joint disease (*osteoarthritis*). It is also essential as a basis for the always detailed and often extensive revision of environmental and psychological factors which is necessary to encourage remission and quiescence in rheumatoid arthritis.

## THE TREATMENT OF PSYCHOGENIC HEADACHES

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Headache is one of the commonest complaints with which the average physician is confronted. Most of us, including myself, have experienced difficulty in dealing effectively with this complaint because of a tendency to focus attention upon some particular aspect of the problem and to neglect other aspects which may be of equal or greater importance. The factor most frequently neglected in the treatment of headache is the personality of the patient and the relationship of life situations to his headaches. From personal experience every layman knows that certain trying situations associated with tension, anxiety, or resentment may precipitate a headache. Yet, too often, the cautious physician overlooks this simple and common cause of headaches and subjects his patient to a battery of diagnostic procedures, thus unwittingly increasing the patient's anxiety and often aggravating his headache.

### *Headache Mechanisms*

To evaluate the role which psychogenic factors may play in the production of headache, it is necessary to review the basic physiologic mechanisms which may cause this symptom in the absence of organic disease in or about the head.

Wolff and his coworkers(1) have shown that the headaches of migraine and hypertension are due primarily to distention and dilatation of branches of the external carotid artery, and that changes in the intensity of headaches are related directly to changes in the amplitude of pulsations in the temporal and occipital arteries. Factors which decrease the amplitude of pulsations, such as digital pressure on the superficial branches of the external carotid artery and the injection of vasoconstrictor drugs, particularly ergotamine tartrate, also decrease the intensity of the headache. Raising the intracranial pressure, which dampens the pulsations of the intracranial arteries and relieves experimental histamine headache, has no effect on the headaches of migraine and hypertension. Scotomata preceding headaches were shown to be due to cerebral vasoconstriction, since they were temporarily abolished by inhalation of small amounts of amyl nitrite.

The same investigators, using various experimental procedures, have produced sustained contraction of the muscles of the scalp and neck, evidenced by increased electromyographic activity, associated with pain in various parts of the head and neck. It was found that in patients suffering from sinusitis, migraine headache, and emotional tension, there is sustained contraction of the neck and scalp muscles, with concomitant pain in the neck and over the back of the head. In a study of the mechanisms of chronic post-traumatic headache, Simons and Wolff(2) found that, with the exception of those headaches associated with subdural hematoma and subarachnoid hemorrhage, the chronic headache following trauma to the head results from sustained contraction of the skeletal muscles of the head and neck associated with the occurrence of sustained resentment, anxiety, frustration, tension, and fear. In many cases the amount of muscle contraction is minimal and probably causes headache only because it is sustained and because of an abnormal preoccupation with the head.

Allergic sensitivity is generally considered to be a cause of chronic headache, and there have been enthusiastic reports of the prevention of migraine and other headaches by the methods employed in the treatment of allergic disorders. Unfortunately, little attention has been paid to the accurate classification of headaches claimed to be of allergic origin, or to the mechanism by which allergic sensitivity might cause headache. In

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1. Wolff, H. G.: Mechanisms of Headache, Arch. Neurol. & Psychiat. 50:224-232 (Aug.) 1943.

2. Simons, D. J., and Wolff, H. G.: Studies on Headache: Mechanisms of Chronic Post-Traumatic Headache, Psychosom. Med. 8:227-242 (Jul.-Aug.) 1946.

other allergic conditions, such as urticaria and bronchial asthma, histamine, or a histamine-like substance, is thought to be responsible for the tissue reactions. Histamine, when injected intravenously in normal individuals, is known to produce marked dilatation and increased pulsation of cranial arteries, accompanied by generalized headache. Wolff and his co-workers have demonstrated that this experimental histamine headache is due to stretching of pain-sensitive structures in the walls of the intracranial arteries. Headaches associated with fever have a similar mechanism.

In 1939 and 1941 Horton(3) reported observations on "a new syndrome of vascular headache," which he called "histaminic cephalgia," characterized by frequently occurring, hemicranial headaches of short duration, beginning in the latter decades of life, involving the eye, the temple, the neck and often the face, and tending to conform to the ramifications of the external carotid artery, the superficial branches of which are dilated and tender. Characteristic attacks were reproduced by the *subcutaneous* injection of 0.3 to 0.5 mg. of histamine, and these, as well as the spontaneous attacks, could be completely controlled by the intravenous injection of adrenalin and other vasoconstrictor drugs. Desensitization to histamine was reported to have brought complete relief to 48 of 63 patients for varying periods. On the other hand, there have been several observations indicating that the *intravenous* injection of 0.1 mg. of histamine tends to reproduce headaches due to various causes, suggesting that histamine acts as a headache-producing agent only by virtue of being a powerful vasodilator and not from a specific sensitivity reaction.

### *Psychogenic Factors in the Etiology of Headache*

It is obvious that physiologic mechanisms known to be implicated in certain types of "functional headache" only explain *how* the patient has headache; they fail to explain *why*. To complete the picture, it is necessary to understand the psychodynamic factors which commonly activate one or more of these physiologic reactions.

The psychoanalytic studies of Fromm-Reichmann(4) indicate that *subconscious hostility* is a significant finding in patients with *migraine*. These individuals have a marked hostility, of which they are not consciously aware, for some person to whom they are closely attached. Often the migraine patient comes from a conventional family with strong solidarity and family pride, in which aggression against one another is forbidden. If one member dares to express hostility against another, he is punished by exclusion, and the fear of such punishment is enough to keep his hostilities repressed. Then, when anger is aroused and cannot express itself adequately, the individual takes it out upon himself, so to speak, in an attack of migraine. Later in life any situation calling for aggression is likely to provoke the same mechanism.

Wolff(5) reported that a psychobiologic study of 46 subjects with migraine revealed them to be peculiarly prone to development of pernicious emotional states, either sustained or episodic; in certain of them a sudden increase in stress was provoked by clearly definable life situations, and such periods were associated with an increase in the intensity and frequency of attacks. More than nine tenths of his subjects had "set" personalities, with perfectionism and a desire to have things "just so" as outstanding characteristics. Ross and McNaughton(6), using the Rorschach method, found that "items associated with migraine can be seen as representing persistence toward success, difficulty in sexual adjustment, perfectionism, inflexibility, conventionality, and intolerance."

The following case history serves to illustrate these principles:

A 26-year-old, married advertising and sales-promotion manager of a retail chain store complained of paroxysmal headaches associated with nausea and vomiting and preceded by visual disturbances and localized areas of numbness. Attacks began with "glimmering" of vision and inability to focus, lasting half an hour. During the next half hour he experienced numbness of one hand and of one side of the lips and tongue, either left or right, associated with slight thickness of speech. As the numbness disappeared a severe headache developed on the opposite side, localized in the fronto-temporal region and associated with nausea and vomiting. During

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3. (a) Horton, B. T., MacLean, A. R., and Craig, W. M.: A New Syndrome of Vascular Headache: Results of Treatment with Histamine, Proc. Staff Meet., Mayo Clinic, 14: 257-260 (April) 1939; (b) Horton, B. T.: The Use of Histamine in the Treatment of Specific Types of Headaches, J.A.M.A. 116:377-383 (Feb. 1) 1941.

4. Fromm-Reichmann, F.: A Contribution to the Psychogenesis of Migraine, Psychoanalyt. Rev. 24:26-33 (Jan.) 1937.

5. Wolff, H. G.: Personality Features and Reactions of Subjects with Migraine, Arch. Neurol. & Psychiat. 37:895-921 (April) 1937.

6. Ross, W. D., and McNaughton, F. L.: Objective Personality Studies in Migraine by Means of the Rorschach Method, Psychosom. Med. 7:73-79 (March) 1945.

the attacks of headache, which usually lasted about one hour, he had noticed increased prominence of the temporal artery on the side of the pain.

He had had one such attack at the age of 15 or 16, two in July, 1946, and four between October, 1946, and January, 1947. In 1940 he developed symptoms of peptic ulcer, which was not diagnosed until 1942, when he was medically discharged from the army with a diagnosis of "duodenal ulcer." After his discharge the ulcer symptoms disappeared, but he continued to have occasional attacks of indigestion and vomiting, which occurred whenever he got into an argument.

Physical and neurologic examination was entirely negative.

The psychiatric history revealed that the patient was an only child, brought up largely by his mother. His father, a railroad man, was away from home most of the time; when at home, he was a strict disciplinarian. The patient did not recall having any hostile feelings against his father until he was 15 or 16 years old, at which time his father began to drink excessively. The patient had to control him, and was always able to do so by reasoning with him. His first attack of migraine occurred at about this time. Since then his father has died. In 1940, while the patient was attending art school, a classmate developed an acute psychosis, and after this the patient became very nervous and had transient phobias of losing his mind. He recalled that his gastrointestinal symptoms appeared at that time. His two migraine attacks in July, 1946, immediately followed the completion of a highly successful advertising campaign which placed his store second highest in the nation and resulted in his being recommended for transfer to a new branch store which was being opened. His transfer became effective in October, and since then he has had four attacks. He has had difficulty in getting along with his new store manager, and he related one of his attacks to a specific situation in which the boss had criticised his work.

The personality inventory revealed compulsive and perfectionistic traits. He said he could not tolerate being in a room that was untidy. When leaving home he would frequently go back to see if he had turned off the lights and locked the door. When he tackled a job he always worked incessantly until it was finished and was not satisfied until it was as near perfect as possible. He also stated that for some time—he could not remember how long—he had shunned arguments by walking away. Whenever he became involved in an argument he would vomit afterward.

This patient described classical migraine attacks. His first attack was related to feelings of resentment toward his father, and his recent attacks occurred in the presence of resentment toward his boss, or father surrogate. He is a compulsive perfectionist who represses his aggressive impulses by walking away. His attacks of vomiting following arguments possibly represent what has been called "abdominal migraine." In my experience migraine is frequently associated with other psychosomatic conditions, and it is of interest that this patient gave a history of duodenal ulcer.

In contrast to the paroxysmal, migraine-type headaches, *tension headaches,* arising from sustained contraction of the muscles of the scalp and neck, tend to be constant over long periods. They are commonly associated with *sustained emotions* of resentment, anxiety, frustration, and depression. Constant headache may also be a complaint of patients with conversion hysteria, neurasthenia, mental deficiency, or simple schizophrenia. In these conditions the headache is often described as having a hat-band distribution or being localized at the vertex, and as giving a sensation of pressure or boring. It is usually impossible to demonstrate any physiologic headache mechanism in these cases, or even to be certain that the sensation described is actual pain, and one is forced to the conclusion that the complaint is symbolic of the individual's inadequacy and inability to adjust to his environment.

### *Diagnosis*

In the differential diagnosis of headaches the most important distinction is between headache symptomatic of organic disease and "functional" headache. The more common causes of organic headaches are various brain lesions, inflammation of the meninges and bones of the skull, sinusitis, and temporal arteritis. Except in cases of disease of the upper cervical vertebrae, pain is never referred to the head from organs outside of the head, although disease of remote organs associated with fever or absorption of toxic products may give rise to vascular headaches by causing dilatation of intracranial arteries.

In practically all cases of *organic* headache the history, physical examination, and laboratory studies reveal the correct diagnosis. X-rays of the skull are always indicated in doubtful cases, both to reveal or to rule out hidden lesions and to assure the anxious patient that nothing has been overlooked. Spinal puncture is occasionally indicated but should be used with discretion in patients suspected of having psychogenic headaches, since these patients frequently develop incapacitating post-puncture cephalgia.

*Functional* headaches must be differentiated into (1) those in which the immediate cause is a disturbed vascular mechanism, such as migraine, hypertensive vascular disease, "histaminic cephalgia," and possibly allergy; (2) those in which the headache is due to sustained contraction of the muscles of the scalp and neck associated with emotional tension; and (3) those in which the headache is symbolic of some subconscious emotional complex. Vascular headaches are always paroxysmal, whereas purely psychogenic headaches may be either intermittent or constant. Patients with psychogenic headaches usually have other symptoms which are quite obviously psychogenic, and neurologic examination may reveal certain findings characteristic of hysteria.

### *The Psychotherapy of Headaches*

I confess to being an amateur in the art of psychotherapy, my experience being limited almost entirely to the management of headache problems. As a clinical neurologist, both in civilian practice and in the army, I have found that a large part of my work is concerned with headaches, and I have gradually developed the conviction that the vast majority of these must be dealt with on a psychobiologic level. Adolf Meyer, in his teaching of psychobiology, emphasized the principle of "levels of integration," which he classified as "the anatomical, the physiological and the psychobiological." In his discussions of therapy he stressed the importance of treating the patient on the level of integration which is primarily disturbed. Headache is a symptom, not a disease; as such, it stands on a physiologic level and can sometimes be effectively treated on this level by altering the headache mechanism through the use of vasoconstrictor agents, by overcoming the individual's sensitivity to histamine, or by the treatment of a specific allergic sensitivity. This statement has been amply proven by clinical experience. However, one sees numerous cases of headache in which attempts to alter a known headache mechanism are ineffective or in which no physiologic disturbance can be demonstrated. Such cases require investigation and treatment on a psychobiologic level, and when this investigation is undertaken it is soon discovered that the symptom of headache is merely a superficial expression of maladjustment or emotional illness.

The first step in the psychotherapy of headaches is to obtain a detailed life history of the patient from a social and psychiatric point of view, complemented if possible by statements from relatives. An attempt is made to correlate the onset and exacerbations of all psychosomatic symptoms, including headache, with environmental situations conducive to stress, tension, anxiety, disappointment, frustration, or hostility. Explanation to the patient of the psychogenic origin of his headaches is best deferred until all the material is available, since many patients resist and resent a pychogenic explanation and it is necessary to prove to them that the diagnosis is correct. In some cases, where the headaches are of relatively recent onset and the personality structure is essentially sound, the mere demonstration to the patient of the causal relationship between environmental stresses and the occurrence of headaches, and the patient's acceptance of this relationship, is sufficient to stop the cycle, and no further therapy is necessary. On the other hand, patients with headaches of many years' duration, particularly patients with low intelligence, continue to resist and argue after all the evidence has been presented. It is my experience that further psychotherapy is a waste of time in such cases and that actually the patient does not want to be helped.

If further psychotherapy appears to be indicated, and if practical considerations permit, the next step is to work out in a series of interviews, preferably at weekly intervals, the patient's basic psychologic difficulties. In civilian practice it is usually impossible to change the environmental situation, so the patient must be taught how to make a better adjustment to existing conditions. In patients who are severely repressed and do not give out information easily, I have found that one or more interviews under intravenous sodium amytal, given slowly until the inhibitions are removed, frequently reveal basic emotional conflicts which the patient had previously concealed. This technique is particularly valuable at times when the patient is suffering from a headache and when the repressed emotional conflict is acute. The mere discussion of this material, with release of the associated emotion, often relieves the patient of a large amount of anxiety, establishes closer rapport with the physician, and permits freer discussion in subsequent interviews. In the course of psychotherapy the presenting symptom is often alleviated without any particular attention's being paid to it, but manifestations of anxiety, which may have been minimal or absent, may become aggravated and distressing. It is well to forewarn the patient of this possibility and to assure him that his anxiety will diminish as treatment progresses.

The results of psychotherapy in cases of headache do not lend themselves to statistical analysis. Success depends upon many variable factors, including the patient's personality structure, his degree of insight, the alterability of his environment, and the amount of time and interest which the physician can devote to his problems. All these factors must be taken into consideration before treatment is undertaken. With a little experience, one can select for brief psychotherapy those patients who appear likely to be benefited—such as those with simple tension and anxiety states—and refer for more thorough psychologic analysis those whose personality disorder appears to require it.

# THE RECOGNITION AND MANAGEMENT OF SUBARACHNOID HEMORRHAGE

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Subarachnoid hemorrhage develops usually as a grave medical emergency whose management is conditioned by time and the possibility of determining the cause and location of bleeding. Prompt decisions are therefore necessary regarding measures to relieve pain, insure rest, and maintain vital functions while the advisability of more specific diagnostic and therapeutic procedures can be determined. Hospitalization is essential to these ends, even though some risk of aggravating hemorrhage may be incurred *en route*.

## *Etiology*

Blood may escape into the subarachnoid space directly from cerebral vessels or by extension from intraventricular or intracerebral hemorrhage. "Spontaneous" hemorrhage consequently may follow rupture of a vascular defect, such as a congenital aneurysm or angioma; or it may result from degenerative, septic or neoplastic erosion of the blood vessel wall, increased vascular permeability (toxic or nutritional), or purpuric blood dyscrasia. Congenital aneurysm predominates as a cause in the younger age group; hypertensive or arteriosclerotic vascular disease, in the older. Traumatic subarachnoid bleeding is fundamentally a neurosurgical problem which deserves separate consideration.

## *Pathologic Physiology*

The clinical manifestations, both irritative and mechanical, of subarachnoid hemorrhage are determined by the site, degree, and duration of bleeding, as well as by its etiology. Intracranial and intraspinal pain-sensitive structures are stimulated to produce headache, radicular pain, and meningismus. Cortical irritation is responsible for apprehensive restlessness, disturbances of the sensorium, muscular twitching, and sometimes convulsions. Local accumulation of blood may compress or displace intracranial structures to produce a variety of neurologic signs.

Continued subarachnoid bleeding is incompatible with survival; in fact, some observers(1) feel that the duration of arterial leakage must be exceedingly brief to permit recovery, because surviving patients seldom show increased intracranial pressure. Blood is removed from the subarachnoid space normally by the comparatively slow process of phagocytosis. With excessive bleeding, therefore, clots accumulate in the basal cisterns, debris clogs the pacchionian filters, drainage and absorption of spinal fluid are impeded, and increased intracranial pressure follows to produce intracerebral venous stasis and even hemorrhage. In addition, reactionary edema may develop in the cerebral tissues underlying the clot, to increase intracranial congestion. When brain swelling is marked, the hippocampal gyri will herniate between the tentorium and the midbrain, compressing vital diencephalic and brainstem structures. Venous outflow from the posterior fossa is then further embarrassed, and intramedullary venous hemorrhages may occur.

## *Symptoms and Signs*

Premonitory symptoms may precede subarachnoid hemorrhage, but few are specific. Recurrent headaches of the migraine type, associated with transitory diplopia (sometimes called "ophthalmoplegic migraine"), are invariably caused by distention of an intracranial aneurysm. In these cases, arteriography and surgical treatment may be possible before rupture takes place. Unfortunately, however, most patients are seen only after leakage has occurred.

Presenting symptoms, occasionally attributable to physical or emotional stress, de-

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1. Kemp, R.: The Lumbar Puncture Pressures in Subarachnoid Haemorrhage, Lancet 2:1369-1371 (Dec. 11) 1937.

velop abruptly with violent throbbing or "bursting" headache accompanied by dizziness, nausea, and vomiting. Pain may be referred to the neck, back, or even to the extremities. Photophobia and fearful restlessness may be followed in minutes or hours by confusion, delirium, stupor, and coma. In some instances, symptoms may abate after a day or two, only to recur with a second hemorrhage — often the result of uncontrolled restlessness. A more insidious onset may simulate that of septic meningitis, especially when fever and meningismus appear.

Examination is often limited by the patient's critical condition. Predisposing disease, such as hypertension, arteriosclerosis, cutaneous telangiectasia, or purpura, may be evident. Sweating and prostration are common. Passive anteflexion of the head meets resistance, and a mild Kernig sign may be found. Fever appears—first as a foreign body reaction, later as a result of dehydration, central disturbance of thermal regulation, or aspiration pneumonia. Relative bradycardia, due to increased intracranial pressure, may give way to tachycardia associated with hyperthermia in the end. Respiration, which is rapid at first, may later become periodic and finally gasping. Blood pressure fluctuates with intracranial dynamics, rises with increasing intracranial pressure, and falls as a terminal event.

From a neurologic standpoint, significant findings are few. Congestive changes appear in the fundi; sometimes papilledema is seen. Characteristic retinal or subhyaloid hemorrhages may follow rupture of the central retinal vein, often on the side of intracranial bleeding. Cranial nerve palsies, when present, may also help to determine the side of hemorrhage. Pupils may be unequal, the larger being on the affected side. Miotic pupils indicate ventricular or pontine hemorrhage. Dysphagia, with suppression of gag and cough reflexes, is conducive to aspiration of throat accumulations. Motor function is often suppressed; tremors or twitching are frequent, although convulsions are rare. Flaccid paralysis of one side and deviation of the head and eyes toward the lesion give evidence of associated intracerebral bleeding. (Intrapontine hemorrhage is distinguished by crossed hemiplegia, with head and eyes deviated away from the lesion.) Decerebrate rigidity and release of postural neck reflexes may accompany the development of a tentorial pressure cone. Tendon reflexes initially are sluggish or absent as a result of cerebral shock. Later, their activity may fluctuate along with the development of pyramidal tract signs—extensor plantar responses and absent superficial abdominal reflexes. These signs seldom render localizing value.

### *Differential Diagnosis*

Conditions to be considered in the differential diagnosis might include aseptic meningitis, encephalitis, and even hysteria, all of which can be eliminated by diagnostic lumbar puncture. Rarely, spinal fluid may contain a few red cells in "hemorrhagic encephalitis" following any one of a number of severe infections, such as influenza and scarlet fever. Various causes for coma should be considered in the unconscious patient, including head injury, epilepsy, diabetes, and uremia. A history of progressive personality change prior to ictus may suggest a frontal lobe tumor, particularly glioblastoma multiforme. Bleeding into such a tumor may occur, and sometimes reaches the subarachnoid space.

### *Laboratory Findings*

Spinal fluid examination is essential for diagnosis and treatment. The findings depend upon the severity and duration of hemorrhage(2). Initial pressure may vary from normal to 700 or 800 mm., averaging about 300 mm. of water. Blockage of the subarachnoid space by clots may cause slow drainage and a poor Queckenstedt response. The "bloody tap" is distinguished by clearing of the turbidity of the draining fluid and by a lack of supernatant xanthochromia. Uniformly or increasingly bloody fluid characterizes true subarachnoid bleeding, and supernatant fluid becomes xanthochromic three to four hours after ictus. The number of red cells in the spinal fluid should be determined for comparison with findings at subsequent spinal punctures, in order to ascertain cessation or recurrence of hemorrhage. The ratio of white to red cells in the fluid first parallels that in the circulatory blood; later (seven to ten days), the foreign-body pleocytosis may simulate that of septic meningitis.

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2. Merritt, H. H. and Fremont-Smith, F.: The Cerebrospinal Fluid, Philadelphia, W. B. Saunders Co., 1937.

Laboratory studies otherwise may contribute little, although hemoconcentration may indicate dehydration. In some instances, tests for capillary fragility and for the bleeding and clotting time may be desirable. Investigation of the nonprotein nitrogen content and the carbon dioxide combining power of the blood is indicated if renal damage is suspected. X-rays of the skull infrequently demonstrate calcification of earlier thrombosed aneurysmal defects. In patients suspected of having an aneurysm, arteriography should be deferred four to six weeks after bleeding has stopped.

### *Prognosis*

Unfavorable prognostic signs include: (1) coma lasting over forty-eight hours; (2) steadily rising temperature, increasing pulse rate, periodic or irregular respiration, and falling blood pressure; (3) initially high spinal fluid pressure; (4) evidence of severe neurologic damage (hemiplegia, decerebrate posture); (5) aspiration pneumonia or atelectasis, and (6) detrimental coexisting disease, such as hypertension, polycythemia vera, or septicemia. In the absence of these signs, the outlook for recovery may be better—especially if specific measures to control bleeding are possible. Leaking aneurysms offer the least pessimistic outlook, with a mortality rate approaching 50 per cent(3).

### *Treatment*

Treatment should be given forthwith, regardless of prognosis. Pain and shock require immediate attention and are best controlled by morphine(4), which is contraindicated only in coma. Chloral hydrate or barbiturates may be tried in cooperative patients. Hyoscine or atropine counteracts nausea and vomiting, and retards bronchial secretions. Control of anxiety and restlessness, which promote bleeding, should be established by either intravenous sodium amytal or paraldehyde, and maintained by paraldehyde given rectally as often as needed. Mechanical restraint is to be avoided. Vomiting is a constant hazard, and it is advisable to give nothing by mouth for the first few days; thereafter, small liquid feedings may be started. Since most patients with dysphagia expire, tube feeding is seldom warranted. Marked dehydration and acidosis should be avoided, but limitation of fluids to 1500 cc. daily is recommended. This amount should be given in the form of intravenous saline with 10 per cent glucose, one ampule of Solu-B, and 500 mg. of ascorbic acid. The efficacy of specific measures to promote clotting is questionable unless a purpuric condition exists.

The use of methods for relieving increased intracranial pressure and cerebral congestion is controversial. Some insist that lowering of the spinal fluid pressure by lumbar puncture may promote hemorrhage(5). Others use this procedure only for diagnosis and relief of headache(4). Merritt(6) states that "there is no adequate physiologic basis for the hypothesis that removal of fluid by lumbar puncture tends to increase hemorrhage." He recommends repeated drainage until the spinal fluid pressure approaches normal. Actually, clinical improvement, especially with regard to headache, disturbance of the sensorium, and medullary embarrassment, often follows removal of spinal fluid. Our policy is to reserve therapeutic lumbar puncture until signs of increasing intracranial pressure appear. Spinal fluid drainage then may be performed if necessary several times daily, sufficient fluid being removed on each occasion to reduce the pressure by one half. Intravenous sucrose (50 per cent), given simultaneously, also helps to relieve cerebral edema. Stimulants such as caffeine sodium benzoate or coramine may be given as often as needed, though the patient is usually moribund when these are required.

Constant nursing care is imperative. A darkened room relieves photophobia, and cold applications to the forehead are comforting. Mouth care, clearing of the airway by suction, and care of the bladder and bowels are essential. The patient should be lifted onto the bedpan, and straining avoided by oil enemas if necessary. Elevating the head of the bed 12 inches may help to relieve cerebral venous congestion. Turning the patient carefully every hour and hyperventilating the lungs with the standard carbon dioxide-oxygen mixture aids pulmonary

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3. (a) Magee, C. G.: Spontaneous Subarachnoid Hemorrhage: A Review of 150 Cases, Lancet 2:497-500 (Oct. 23) 1943.
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6. Merritt, H. H.: The Diagnosis and Treatment of Vascular Lesions in the Brain, M. Clin. North America 22:577-589 (May) 1938.

ventilation. Respiration may be supplemented by nasal oxygen (5 liters per minute) if cyanosis develops.

Control of hemorrhage by manual carotid compression and later by careful carotid ligation should be considered if clinical signs or electroencephalography(7) indicate which side is the site of hemorrhage. The risk of massive cerebral infarction incident to such a procedure varies inversely with the patient's capacity to establish collateral circulation, and increases with age and vascular disease. When intracerebral hemorrhage or tumor is suspected, cerebral decompression with aspiration or resection may be lifesaving. Competent neurosurgical help, therefore, is always to be sought in such instances.

In convalescence, prolonged bed rest (four to six weeks) should be enforced. Too often a patient will disobey orders, resume activity prematurely, and promptly suffer a second and more severe hemorrhage. A quiet existence, aided by sedatives and the avoidance of all stress, should be encouraged for six to twelve months, or until an aneurysm or other vascular defect can be demonstrated by arteriography and treated surgically.

7. Woodhall, B. and Lowenbach, H.: Congenital Cerebral Aneurysms Lateralized by Electroencephalography, South. M. J. 36:580-587 (Aug.) 1943.

## THE TREATMENT OF THE CHRONIC CONVULSIVE DISORDERS

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The treatment of epilepsy has, during the past decade, received new impetus from the discovery of additional anticonvulsive drugs. Detailed electroencephalographic studies have contributed new information about the cause of convulsions and have been of diagnostic assistance. However, the real pathogenesis of a convulsion is still obscure, and no specific cellular pathema has been demonstrated.

### *Differential Diagnosis of Convulsions*

A convulsion is a manifestation of a disease, not a disease itself. It is due to abnormal discharges from neuronal cells in the central nervous system. Every individual is a potential epileptic because each has a convulsive threshold, which may be high or low. The borderline between the "normal" and the "epileptic" is, at times, quite indistinct. Most persons have had spontaneous muscular jerks and twitchings. These are larval seizures and occur most commonly with fatigue. The concept that every person has his own convulsive threshold is important in the management of the chronic epilepsies. However, it is also well known that fits of one kind or another may be an early manifestation of serious brain disease.

When an individual has a convulsion for the first time, the principal duty of the physician is to try to determine whether or not there exists an organic disease of the nervous system. A neurologic examination is essential, and various laboratory studies may have to be done. Should there be findings indicative of a localized brain disorder or signs of increased intracranial pressure, pneumoventriculography will be necessary to rule out an expanding intracranial lesion. Patients who have been subject to convulsions for years and are still normal, physically and mentally, do not present such a diagnostic problem. It should be stated that neither convulsions in themselves nor the usual drugs used for their control will produce mental deterioration. When such deterioration occurs, we are dealing with an organic disease of the brain, the seizures being only a manifestation of that morbid process.

For the adequate treatment of cryptogenic (idiopathic) epilepsy it is essential for the physician to obtain certain specific information from the patient or his family. This ought to include the following facts: (1) the type or types of seizures; (2) the frequency of the attacks; (3) the time of day, month or year when they occur most often; (4) the presence or absence of any form of epilepsy in the family history; (5) any extraneous factors known to precipitate the attacks; and (6) past and present medication and the results obtained from it.

Since seizures are caused by abnormal neuronal discharges and since there exist numerous groups of neurones, all with great specificity of function, it is clear why there are many types of epilepsy and epileptic "variants." The majority of seizures will fall within three main groups: (1) grand mal, (2) petit mal, and (3) psychomotor attacks. The grand mal attack is characterized by a generalized tonic-clonic convulsion with complete loss of consciousness. Petit mal usually

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consists of a transient loss of awareness, or a "blank spell," but there are other forms of these momentary minor seizures. In psychomotor epilepsy there exists, temporarily, an abnormal mental state accompanied by unusual motor manifestations.

### *Drug Therapy*

It is impossible to control convulsions by prescribing just any kind of anticonvulsive medication to be taken indiscriminately. One must select the drug which is most effective against the type of seizure being treated. It ought to be given in the smallest amount that will adequately control the seizures, and at the time when the greatest benefit will be derived from it. If a patient is subject to more than one type of attack it may be necessary to prescribe, in proper ratio, two or more of the preparations at our disposal. A medicine that is highly efficacious for one patient may be almost useless for another. For this reason it is frequently necessary to try different drugs and various combinations until the most effective formula is found.

#### *Grand mal*

The best therapeutic agent for major convulsions is dilantin(1). The usual adult dose is a 0.1-Gm. (1½-grain) capsule taken three times a day after meals. In severe cases a total of 0.5 Gm. in twenty-four hours may be required. The toxic effects of dilantin include giddiness, ataxia, skin rash and hypertrophy of the gums.

The barbiturate preparations have the most universal anticonvulsive action. Phenobarbital may be given in doses of 0.03 Gm. (½ grain) to 0.1 Gm. (1½ grains) three times a day. Mebaral(2) has been, in my experience, equally as good as phenobarbital, and it causes less drowsiness. The symptoms of toxicity are those common to the barbiturates. The usual dosage is 0.1 Gm. (1½ grains) two to four times a day. Should large amounts of the barbiturates be required, the resulting drowsiness can be offset by small doses of amphetamine sulfate (benzedrine). Under no circumstances should the barbiturates be discontinued abruptly, because this may precipitate a series of attacks.

The bromides are occasionally beneficial when other less toxic drugs have failed. The dose usually required ranges from 1.2 Gm. (20 grains) to 1.8 Gm. (30 grains) per day. The blood bromide level ought to be kept at about 40 mg. per 100 cc. The bromides are tolerated unusually well by epileptic patients, but symptoms of poisoning, such as headaches, mental confusion and a vesicular skin eruption, will be encountered if the blood bromide level becomes too high.

#### *Petit mal*

These minor seizures usually respond well to either mebaral or phenobarbital given in the proper dosage. Dilantin is useless against petit mal attacks, and may cause them to occur with greater frequency. A new drug, tridione(3), is efficient in controlling some cases of minor fits. The average dose is 0.3 Gm. (5 grains) three times a day. Toxic effects, which are infrequent, include gastric disturbances, skin rash, lassitude, and slight drowsiness. It has been reported to have caused fatal aplastic anemia and agranulocytosis; this serious complication is evidently rare, but patients who are taking this drug regularly ought to have periodic blood counts. In this clinic we have seen eosinophilia (5 to 20 per cent) associated with tridione therapy. A common side effect in adults, apparently harmless, is photophobia. This often makes it necessary for the patient to wear dark glasses when in bright light.

It is common for patients to be subject to both grand and petit mal attacks. In mild cases the barbiturates alone will often give adequate control of both. In the more severe cases it is necessary to use dilantin and one of the barbiturates, or dilantin plus tridione. Dilantin ought not to be used alone in patients who have both petit mal and grand mal seizures.

#### *Psychomotor attacks*

Psychomotor attacks seemingly are helped by all three drugs—dilantin, the barbiturates, and tridione—but often do not respond too well to any of them. Each of these three anticonvulsive substances ought to be tried alone, and in the various possible combinations. This trial-and-error method is often

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1. Dilantin (diphenylhydantoin sodium—Parke-Davis) is marketed in 0.06-Gm. (½-grain) and 0.1-Gm. (1½-grain) capsules.

2. Mebaral (N-methylethylphenyl barbituric acid—Winthrop) can be obtained in pills containing 0.06 Gm., 0.1 Gm., and 0.2 Gm. (3 grains).

3. Tridione (3,5,5,-trimethyloxazolidine-2,4-dione—Abbott) is available in 0.3-Gm. (5-grain) capsules.

necessary before a formula can be found that is beneficial.

### *Management of Precipitating Factors*

The recent enthusiasm over drug therapy ought not to eclipse other important points in the medical management of epileptic patients. Very often a carefully obtained history will reveal definite situations which, time and again, precipitate attacks. A few factors commonly incriminated are fatigue, loss of sleep, constipation, imbibition of alcohol, hunger, anxiety, and nervous tension. If any of these factors are found, and the patient can be persuaded to avoid them, then the drug requirement frequently will be lessened. Should such situations be unavoidable, an extra amount of anticonvulsive medicine should be taken by the patient when he knows that he is going to be vulnerable to epileptic seizures. In the female, attacks often are associated with menstruation. It is generally conceded, however, that the production of an artificial menopause is of no value in reducing the total number of attacks. The rational therapy is to increase the dosage of the medication when the seizures are anticipated. Some women need take dilantin for only about ten days in each month.

### *Conclusion*

In this brief article it has only been possible to outline the general principles of treatment of the convulsive disorders. Every patient with epilepsy presents to the physician a problem which must be handled as a separate and individual one. It is important to impress upon patients who have convulsions that they are not afflicted with an unusual disease or with a condition that implies a psychopathic taint or a social stigma.

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**The treatment of psychoneurosis** begins with the history and physical examination. Even if the physician is positive of the diagnosis, a careful history and physical examination will be found time-saving and of specific value during subsequent visits. The physician should be meticulous, patient, and personal in taking the history. In addition to the usual medical history, a careful account of the patient's life must be recorded. It may not be tactful during the first visit to begin at infancy and progress through the years, but within two or three visits the physician should know the patient almost as well as he knows a member of his own family. The physician who is willing to listen has no difficulty in getting the psychoneurotic to talk.—John D. Campbell: Everyday Psychiatry, Philadelphia, Lippincott, 1945, p. 142.

# MODERN CONCEPTS OF THE TREATMENT OF PEPTIC ULCER

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For many years the medical profession has sought an answer to the problem of peptic ulcer. The pendulum has swung back and forth between medical and surgical treatment, as neither has proven entirely satisfactory. In the past there has been no general agreement as to how ulcers should be managed. There was a time when the treatment that a patient received was largely a matter of chance. If he happened to be admitted to a surgical service, operation was often advised, regardless of the nature or duration of the ulcer symptoms; if he were admitted to a medical ward, conservative treatment was generally employed until it became apparent that he would not recover under a medical routine. Some time ago gastroenterostomy was performed frequently, but because the results were unsatisfactory, this operation has been largely discarded except in elderly patients having pyloric obstruction of long standing. Within the past decade gastric resection has been the operation of choice in patients having intractable ulcer, but this procedure carries a definite mortality and recurrences are not uncommon. Recently vagotomy has been offered to the profession as a possible solution of the problem. It would seem desirable, therefore, to review briefly the whole subject of the treatment of ulcer in an effort to evaluate the various forms of therapy which are being employed today.

Until the etiology of a disease is fully understood, progress in the treatment of that disease is apt to be slow and discouraging. This statement is particularly true of ulcer. Although many contributing factors are recognized, the exact cause of the disease is still unknown. While many different and totally unrelated methods of treatment have been advised, the general principles laid down many years ago form the basis of medical treatment today. Briefly, there are: (1) rest, both physical and mental; (2) frequent feedings to prevent overactive peristalsis; and (3) neutralization of the acid gastric juices. To decide when medical measures

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should be employed and when surgery is indicated is frequently a difficult matter. Since the decision rests upon the merits of the individual case, the treatment of different types and complications of peptic ulcer will be discussed under separate headings.

### *Simple Duodenal Ulcer*

Certainly the treatment of simple, uncomplicated duodenal ulcer is strictly medical. This statement is especially true in the young individual whose ulcer has been present for only a short period of time. Whenever possible, hospitalization should be urged to insure both physical and mental rest. The Sippy diet, or a modification thereof, is generally employed. Drugs are not particularly important, although the use of antispasmodics, sedatives, and amphojel or a similar preparation is customary. Tobacco should be forbidden, or at least restricted. If hospitalization is impracticable, similar treatment at home should be advised, though it should be recognized that the results of treatment in the home are sometimes discouraging. In some cases ambulatory treatment of a simple ulcer may be justified, but the patient should be warned that this is the least desirable method of all.

Healing of an uncomplicated ulcer is usually not difficult to accomplish. The problem is to prevent recurrences. Some patients who have a clear insight into the situation can, by careful attention to their diet and regulation of their lives, prevent a return of the ulcer. There is, however, a fairly large group of patients who, though they understand their problem, find it impossible to remain well when they return to their usual activities. The same factors, whether social, domestic, or economic, which operated originally to produce the ulcer are still present, and no amount of explanation by the physician or cooperation on the part of the patient will suffice to prevent a recurrence.

### *Chronic or Recurrent Duodenal Ulcer*

The decision between medical and surgical treatment is always a difficult one in this group of cases. As was pointed out above, the usual recurrence will subside promptly under adequate hospital care. Certainly one should hesitate to subject a patient to operation if his illness can be handled properly by a few weeks of hospitalization. However, there are two types of patients who do not fall into this category. One is the patient whose ulcer does not respond to medical care and whose pain persists in spite of the best that the physician and hospital afford; the other is the patient whose ulcer symptoms subside under treatment, but promptly recur as soon as he resumes his usual activities. Both these groups of patients are candidates for surgery. The situation should be explained carefully and final decision left to the patient himself.

Once operation is decided upon, the type of surgery to be employed is the next problem. For the most part gastroenterostomy has been abandoned in this type of patient. Gastric resection has wide popularity, and is practiced throughout the country. Within the past two or three years, however, resection of the vagus nerves, by either the transthoracic or the subdiaphragmatic approach, has been advocated as a possible substitute for resection. Although the results of this operation have been dramatic to date, it must be emphasized that it is still in the experimental stage and cannot be evaluated properly until careful follow-up studies of at least five years have been conducted.

### *Ulcer with Hemorrhage*

Certainly the usual patient with an upper intestinal hemorrhage is a medical problem. Bed rest, hospitalization, if possible, sedatives (not morphine) in the apprehensive patient, and a modification of the Meulengracht diet are usually recommended. While feeding should be started early, it is useless to give anything by mouth to the patient who is actively nauseated or actually vomiting blood. Should the hemorrhage be so profuse or prolonged as to cause shock, the general principles of the treatment of shock are employed.

In the young patient hemorrhage, while alarming, is rarely fatal. In the older individual with sclerosed vessels recurrence or continuation of the bleeding is much more frequent. While some writers advocate immediate surgery in patients of the older age group, our practice at Duke Hospital is to treat them conservatively until it becomes apparent that the bleeding will not cease. When we are satisfied of this fact, the patient is prepared for surgery by multiple transfusions, and a subtotal gastric resection is performed. It might be said with some degree of truth that, given an adequate amount of blood and a good surgeon, no one should die of a bleeding ulcer.

The role of vagotomy in the treatment of recurrent hemorrhage is a matter of considerable interest. If, as seems to be true, resection of the vagus nerves will prevent recurrent hemorrhage in patients with chronic ulcer, the operation should certainly be seriously considered for a patient who has had multiple massive hemorrhages.

### *Obstruction*

When pyloric obstruction results from a duodenal ulcer, the physician must decide whether the obstruction is due to swelling and edema or to scarring. Too often an x-ray study showing complete retention at six hours is interpreted as meaning that scar tissue is present. In young people and in patients with an ulcer of short duration, such obstruction is often due to an acute inflammatory process with edema and spasm. This type of obstruction will frequently respond promptly to adequate medical treatment, including continuous suction—or, if this is impracticable, nightly aspiration—in conjunction with a modified Sippy diet, antispasmodics, and amphojel. Certainly if pyloric obstruction is not due to actual scar tissue, operation should be avoided.

On the other hand, obstruction from scarring is an irreversible process and there is but one answer—surgery. In the older person a simple gastroenterostomy is the operation of choice, and the results are usually excellent. In a younger patient with high gastric acidity it is probably wiser to do a resection.

### *Perforation*

The treatment of perforation is immediate surgery, although recovery has been reported in patients treated without surgery by keeping the stomach completely empty for several days with continuous suction. The usual procedure is simple closure of the perforation. To allow such a patient to return to an unrestricted diet and his usual routine is merely courting trouble. It is always wise to advise the patient to follow a modified Sippy diet and routine for many months following a perforation.

### *Gastric Ulcer*

The patient with a gastric ulcer is always a difficult problem. A large ulcer on the greater curvature should be considered malignant, and a gastric resection performed. A small ulcer on the lesser curvature in a young person is probably benign, but if the ulcer fails to heal promptly the stomach should be resected. Because of the danger of malignancy, vagotomy probably should not be performed in patients with gastric ulcer.

### *Marginal Ulcer*

One of the most serious complications of gastric surgery is the development of a marginal ulcer. The surgeon usually claims that the marginal ulcer is a medical problem, while the internist is equally insistent that it is the surgeon's responsibility. Such ulcers are difficult to treat medically; they frequently bleed or perforate, and the formation of a gastroenterocolic fistula is not uncommon. The usual medical measures are apt to have discouraging results. Conventional surgery entails taking down the enterostomy, resecting the ulcer, and performing another anastomosis. This is a difficult procedure and one which the surgeon does not particularly relish.

It is in patients with marginal ulcer that vagotomy has had its most brilliant success. These patients have usually had their ulcer for years, and have had numerous operations. The complete relief of pain which usually follows vagotomy is a blessing indeed. If the immediate, dramatic results which are routinely observed in this type of patient after vagus resection are maintained over a period of years, it goes without saying that this is the operation of choice in patients with marginal ulcer.

### *Summary*

It has been said that surgery is but an episode in the medical treatment of peptic ulcer. Certainly this statement is true of the conventional surgical procedures usually employed today. The simple, uncomplicated ulcer is always a medical problem. In the absence of obstruction or perforation, surgery is never resorted to unless the patient has intractable pain which fails to respond to medical treatment, or unless he is one of those individuals whose social, domestic, or economic status is such as to render rehabilitation impossible by medical measures. It should be clearly understood that resection of the vagus nerves is still in the experimental stage; although the early results have been dramatic, a number of years must necessarily elapse before the procedure can be accurately appraised.

Certainly we as physicians should realize that there is no rule of thumb to be followed, no dogmatic criteria to be laid down which can be employed blindly in the treatment of ulcer. Every case is a law unto itself, and the treatment of each patient must necessarily be decided upon the individual merits of his case.

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# THE TREATMENT OF ANEMIA

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Fundamentally, there are only three causes of anemia: (1) blood loss, (2) excessive blood destruction, and (3) insufficient blood formation(1). The alterations in the red cell volume (mean corpuscular volume), cell shape, and hemoglobin content (mean corpuscular hemoglobin content, color index) are most important and are characteristic of the different types of anemia(2). It is essential that the specific type of anemia be recognized before treatment is attempted.

*For therapeutic purposes* the anemias can be divided into three main groups: (1) the anemias which respond to iron or liver fractions insoluble in 70 per cent alcohol, (2) the anemias which respond to a liver fraction soluble in 70 per cent alcohol and to folic acid, and (3) anemias which do not respond specifically to iron, liver, or folic acid.

## *Anemias Which Respond to Iron and Crude Liver Extract*

1. **Anemia of acute blood loss**
2. **Anemia of chronic blood loss**
3. **Nutritional anemias**
4. **Idiopathic hypochromic anemia**
5. **Anemia of vitamin deficiency**
6. **Anemia of pellagra**
7. **Anemia of thyroid insufficiency**
8. **Hypochromic anemia of pregnancy**
9. **Nutritional anemia of infancy**
10. **Hookworm disease**

*The blood picture* in this group of anemias is normochromic or hypochromic in type. The red cell size is normal or decreased (microcytosis), and the cells may vary strikingly in shape (poikilocytosis). The color index, mean corpuscular hemoglobin content, and mean corpuscular volume are usually less than normal. The white cell count is variable, though often elevated, and nucleated red cells may appear in the circulation if there is excessive demand on the bone marrow. The reticulocytes are increased in numbers only after initiation of adequate therapy. *The bone marrow* is usually hyperplastic. The erythroid elements are plentiful at the normoblast or erythroblast level, depending on the duration and severity of the anemia. In the severe anemias there may be also an arrest in the maturation of the myeloid elements.

These anemias respond specifically to iron. At times several preparations will have to be tried before one is found which the patient will tolerate. Ferric salts are less effective than ferrous compounds, whether organic or inorganic. The most commonly used preparations are Blaud's pills, ferrous sulfate, ferric ammonium chloride, and enteric-coated tablets of ferric salts. Occasionally, injections of inorganic iron (ferric) are necessary to produce a quantitative increase in hemoglobin(3). The dosage of iron should be large enough to induce proper regeneration of hemoglobin. Failures in treatment are often the result of giving too little iron. In children, 0.1 to 0.3 Gm. of iron salt three times daily will suffice. In adults, the dose should be at least 1.8 Gm. a day until adequate blood regeneration has occurred. The maintenance dose will depend on the individual requirements. Crude liver extract has been used effectively in the treatment of these anemias, but refined liver extracts are of no value.

*The anemia of acute blood loss* does not respond specifically to iron. The treatment of this condition is control of the bleeding and the administration of plasma and blood transfusion to rebuild the blood volume. A single hemorrhage produces a leukocytosis of short duration (twelve to twenty-four hours), and an increase in platelets and reticulocytes. Recurrent bleeding may be suspected by the reappearance of leukocytosis. Iron is useful only if the bleeding is a complication of some other condition which

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has resulted in insufficient blood regeneration. The normal individual can lose 50 per cent of his hemoglobin by bleeding, and regenerate it at a rate of 1 per cent a day. He will restore his red cell values in four to six weeks and his hemoglobin values in six to eight weeks without the aid of iron.

Patients who suffer from *anemia due to chronic blood loss* (hemorrhoids, ulcerations of the gastro-intestinal tract, or polyposis) need iron. Not only do they suffer from a severe hypochromic anemia, but their hemoglobin (iron) and cell-building stores are often exhausted. It is essential to stop the blood loss. Supportive measures include transfusions of blood, and plasma transfusions are necessary when the plasma proteins have been depleted as a result of edema or the liver damaged by the long-standing anemia.

*The nutritional anemias* are caused by defective nutrition. This may be due to functional or anatomic alterations of the gastro-intestinal tract, or to metabolic disorders, faulty diet, or infection. These abnormalities lead, sooner or later, to a hypochromic anemia, which responds to iron. The diet is most important. If the proper food intake is assured, many of the clinical manifestations, such as glossitis and cheilosis, will disappear. Occasionally these symptoms persist despite various forms of treatment, including the administration of vitamins (riboflavin), crude liver extract, adequate diet, and iron.

*Idiopathic hypochromic anemia* is quite common, particularly in young and middle-aged women (usually slender brunettes). The chlorotic anemia responds specifically to iron. Hypochlorhydria is present in 70 per cent of these patients, and achlorhydria in 25 per cent(4). The administration of dilute hydrochloric acid, 15 to 20 drops in an ounce of water by mouth fifteen minutes before meals, or of capsules containing hydrochloric acid such as acidulin, frequently relieves the gastric discomfort from which many of these patients suffer. Patients with this anemia often need iron indefinitely to maintain their health, despite an adequate diet. These women are subject to severe pelvic disorders (metrorrhagia) and may fall prey to unnecessary surgery. A few of these patients develop pernicious anemia in later life.

*In vitamin C deficiency (scurvy)* the anemia may be macrocytic if the patient is an infant less than 6 weeks old, or it may be hypochromic and microcytic. If it is macrocytic, it will not respond to refined liver fractions. Scurvy in infants may be due to the exclusive use of pasteurized milk or to reliance on some proprietary baby foods which lack ascorbic acid; in elderly people, particularly single men, it may be due to poor eating habits (bachelor's scurvy). The anemia responds specifically to the administration of ascorbic acid. In children 25 mg. three times daily is sufficient; adults may require 100 mg. three times a day. After ascorbic acid has been given, reticulocytosis appears. The administration of iron only enhances the regeneration of hemoglobin.

*Pellagra* (niacin deficiency) does not cause anemia *per se*. A few patients develop a macrocytic anemia, many more a hypochromic anemia. Nicotinic acid has no anti-anemic properties(5), but corrects the underlying deficiency(6). Iron is useful to accelerate the regeneration of hemoglobin. Pellagra can be a complication of some other disease, and may develop even when the patient is receiving refined liver extract parenterally(7).

*In hypothyroidism* (myxedema) anemia is rather common and is usually of the hypochromic type. The bone marrow is usually hypoplastic, although few observations are available. The anemia of thyroid insufficiency may be due to defective gastric secretion, decreased appetite and inadequate diet, or it may be an attempt of the organism to adapt the hematopoietic system to the diminished oxygen requirements of the tissues. About 53 per cent of hypothyroid patients show achlorhydria. These patients need thyroid extract (1 to 5 grains a day), iron, and often dilute hydrochloric acid by mouth. Blood regeneration does not occur until the thyroid deficiency has been corrected.

*In pregnancy* the most common anemia is of the hypochromic type. One third of pregnant women in the first trimester and one half of women in the last trimester have red cell counts below 3,500,000. They present the usual symptoms of a chlorotic anemia (fatigue, breathlessness, glossitis, tachycardia, koilonychia). They respond specifically to iron. Many have achlorhydria, which

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requires the use of dilute hydrochloric acid. The gastric anacidity disappears in many of these women after the termination of pregnancy. The diet must of course be rich in proteins and vitamins.

*In infancy* a hypochromic anemia may be the result of many factors: blood loss, gastrointestinal disease, nutritional and vitamin deficiencies, metabolic disturbances, acute and chronic infections. The diet is very important. It must be remembered that milk contains little iron, and that large amounts of milk may interfere with the absorption of iron. Growth invites anemia if the iron intake is not adequate. Achlorhydria occurs in many anemic infants, but its significance is not clear. The maternal legacy is most important, since anemic mothers are unable to supply their offspring with proper stores of blood-building substances(8). These children need iron and, in some instances, hydrochloric acid. Often this anemia can be prevented by treating the iron-deficient mother during pregnancy.

The symptoms of *hookworm disease* are due largely to the anemia. The severity of the anemia is not dependent on the number of worms which the individual harbors. Epigastric pain, abdominal cramps, vomiting, constipation or diarrhea, pallor, glossitis, abdominal distention, and arrest in growth are common. The hypochromic anemia responds to iron therapy, whether or not the parasites have been eliminated. In such cases, the eosinophilia persists.

### *Anemias Which Respond to Refined Liver Fractions (Soluble in 70 Per Cent Alcohol)*

1. **Pernicious anemia**
2. **Sprue**
3. **Anemias of diseases of the gastrointestinal tract**
4. **Macrocytic anemia of pregnancy**

These anemias are due essentially to insufficient blood production. The *peripheral blood* fails to show evidences of a bone marrow activity which might indicate a graded physiologic response to the existing anemia. The red cells are either of normal volume or larger, and their hemoglobin content is never greatly reduced. The anemia is hyperchromic and macrocytic. Leukopenia and thrombopenia are often present. At times, the plasma contains an excess of pigment, but this is not due to abnormal blood destruction. The *bone marrow* is uniformly hyperplastic and shows a striking arrest in the maturation of the erythroid elements. Megaloblasts are abundant. This arrest in maturation of the erythroid elements can be caused by (1) lack of the extrinsic factor (B-complex derivative), (2) lack of the intrinsic factor of Castle, (3) inability to absorb the maturation factor, (4) inability to store the maturation factor, or (5) deficient utilization of the maturation factor. There are, then, many conditions which may give rise to a macrocytic hyperchromic anemia.

*Pernicious anemia and sprue* usually respond satisfactorily to treatment with parenteral extracts of liver. During the past two years, it has been found that folic acid (L. casei factor) is effective in the treatment of pernicious anemia, nutritional macrocytic anemia, and sprue(9). We have used folic acid in 6 patients with pernicious anemia. Patients who received 30 to 50 mg. daily had a reticulocyte response comparable to that obtained with adequate doses of refined liver extract parenterally. The patients were kept on this dosage for two weeks, or until the reticulocyte peak had been passed. They then received 10 mg. daily until their red cell count had reached normal. The maintenance dose was 5 mg. daily. Although they were able to maintain their red blood cell and hemoglobin levels, the mean corpuscular volume remained above normal and macrocytosis persisted. It seems that folic acid lacks something which enables the proper liver fraction to correct completely the bone marrow abnormality. Recently it has been reported that folic acid has no effect on the neurologic complications of pernicious anemia(10). Further observations are necessary to settle this question.

*Various diseases of the gastrointestinal tract*, such as cancer of the stomach or ascending colon, may interfere with the absorption or utilization of the extrinsic (hypostatic), intrinsic, or maturation factor, and lead to the development of a macrocytic anemia with a megaloblastic bone marrow. Cirrhosis of the liver or some other hepatic disease may make it impossible to store the maturation factor, so that a macrocytic anemia results. Such patients must receive refined liver fractions parenterally; oral liver

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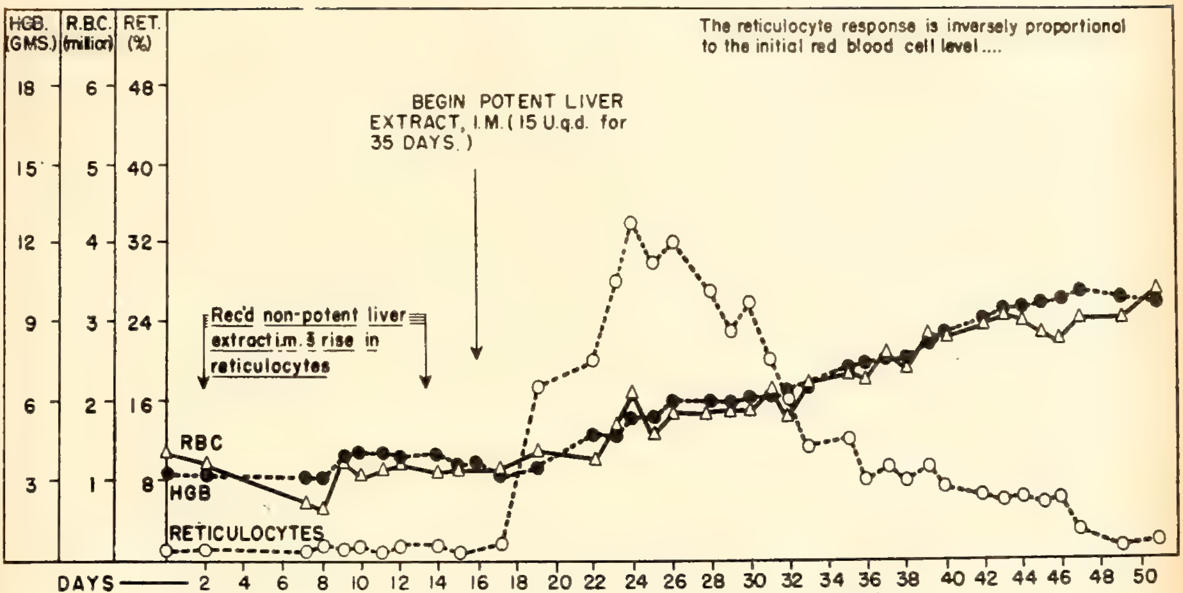

Treatment of Pernicious Anemia with Liver Extract

NO RESPONSE TO RELATIVELY IMPOTENT PREPARATION OF LIVER EXTRACT FOLLOWED BY A MARKED RISE IN RETICULOCYTES WITH A MORE POTENT EXTRACT. . . .

extract or folic acid by mouth is used only if the absorptive properties of the gastrointestinal tract are adequate.

During *pregnancy* a severe and even fatal macrocytic anemia may develop without obvious cause. The great majority of these patients have achlorhydria, and many lose the intrinsic factor. These patients respond, as a rule, specifically to the parenteral administration of liver extract. Some of these women have spontaneous remissions after the termination of pregnancy.

### *Anemias Which are Refractory to Liver Fractions, Iron, and Folic Acid*

1. **Hemolytic anemias**
   - a. **Congenital hemolytic icterus**
   - b. **Sickle-cell anemia**
   - c. **Cooley's anemia**
   - d. **Erythroblastosis foetalis**
   - e. **Acquired hemolytic anemia**
     - **Malaria**
     - **Transfusion accidents**
     - **Infections**
     - **Neoplasms**
     - **Physical and chemical agents**
   - f. **Idiopathic hemolytic anemia**
2. **Non-regenerative anemias**
   - a. **Myelophthisic anemias**
     - **Chemical and physical agents**
     - **Tumor, cancer, myeloma, lymphosarcoma**
     - **Blood dyscrasias—leukemia**
     - **Aplastic anemia—marrow empty**
   - b. **Aplastic anemia—marrow full**
   - c. **Achrestic anemia**
3. **Splenic anemias**

The *hemolytic anemias* exhibit a graded physiologic response of the bone marrow. Therefore, the peripheral blood picture will be characterized by reticulocytosis, basophilia, leukocytosis, and a normochromic, usually normocytic anemia. The plasma pigments, icterus index, and urine urobilinogen will be increased. The van den Bergh reaction is indirect and the jaundice is proportional to the degree of anemia. The bone marrow is markedly hyperplastic, but there is no arrest in maturation. The treatment of these anemias varies. The congenital hemolytic icterus is favorably influenced by splenectomy, but the other forms of congenital hemolytic anemia do not respond to splenectomy.

The *splenic anemias* form a hybrid group and do not constitute a true clinical or biologic syndrome. Most cases of so-called "splenic anemia" will turn out to be instances of cirrhosis of the liver with enlargement of the spleen. The anemia is due to nutritional deficiencies, and often to blood loss from the gastrointestinal tract. Splenectomy is at times helpful, but often a risky procedure(11). If the leukopenia is marked and the bone marrow is full, liver extract and pyridoxine may be beneficial.

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11. Hanrahan, E. M., Jr.: Splenic Anemia; A Study of End-Results with and without Splenectomy Based on 35 Cases, Arch. Surg. 10:639-698 (March) 1925.

### *Conclusion*

Anemia is rarely the result of a single factor. An anemia due to chronic blood loss may be altered and enhanced by nutritional deficiencies. The hemolytic anemias may be complicated by blood loss, metabolic upsets, and intercurrent infections, or bleeding may alter the picture of a macrocytic anemia. Hypochromic anemias are treated with iron or crude liver extract, preferably the former. These anemias do not respond to liver fractions potent in the treatment of pernicious anemia and allied conditions. The macrocytic anemias respond to these fractions, and not to iron. In some anemias with achlorhydria, dilute hydrochloric acid will allay the digestive discomfort. Some of the anemias are caused or are accompanied by a specific vitamin deficiency. This deficiency must be corrected to insure an adequate response to anti-anemic treatment. A diet rich in blood-building substances is always necessary.

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# THE TREATMENT OF DIABETIC ACIDOSIS

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Although patients with diabetic acidosis are seen with less frequency than formerly, the condition is still too common. Prevention of acidosis is the ideal goal for which the patient and physician should strive. In all cases coma is avoidable, and in most instances acidosis may be prevented. An analysis of the records of 139 patients admitted to Duke Hospital in diabetic coma(1) showed that failure to take insulin or the administration of inadequate amounts of insulin was almost invariably the precipitating factor in the production of acidosis. In some instances infection was present and the dose of insulin had not been increased to compensate for this complicating factor.

In view of the still too frequent occurrence of diabetic coma it is thought that an outline of the treatment employed at Duke Hospital for diabetic acidosis should be reported. It must be pointed out that no regimen or treatment is inflexible, but must be varied to fit each individual case. For that reason the outline of therapy is divided into three parts: (a) slight acidosis, (b) acidosis in the pre-comatose state, and (c) acidosis in coma.

### *Slight Acidosis*

Under this heading are included patients who present the following symptoms and signs: polyuria, polydipsia, and perhaps anorexia along with malaise and drowsiness. There is usually a history of some abdominal symptoms, such as nausea and vomiting, which caused the patient to leave off his insulin. The physical examination for the most part reveals no pertinent findings; the patient is able to take and retain fluids by mouth. The urine gives a 4 plus reaction for sugar, acetone, and diacetic acid, but usually contains no albumin or casts. The blood sugar may be 300 mg. per 100 cc. or more, and the carbon dioxide combining power of the serum is not usually below 30 vols. per cent.

Obviously the therapy in this group of patients presents no great problem. However, prompt and vigorous measures must be undertaken at once. The outline of treatment is as follows:

(1) Urine and blood specimens are obtained at once. The urinary excretion of glucose and acid bodies is determined at hourly intervals, until the urine is free of acid bodies and practically clear of glucose. Determinations of the blood sugar and the carbon dioxide capacity of the serum are made at intervals of two hours until normal values are obtained.

(2) Fifty units of unmodified insulin are given subcutaneously, at once. This dose should be given in two or more sites and should be followed every hour by the administration of 25 units of unmodified insulin until the blood sugar approaches normal and a marked reduction in the urinary excretion of glucose occurs.

(3) Parenteral fluid should not be given to this type of patient. Two hundred cubic centimeters of hot broth should be given by mouth every hour. Broth made from prepared bouillon cubes contains an average of 1.1 per cent of sodium chloride. This amount is ample for the patient in slight acidosis, since 8.8 Gm. will be taken over a period of four hours. Glucose in the form of orange juice should also be given every hour, alternating with the broth. It is recommended that the broth be given every hour on the

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1. Nicholson, W. M. and Branning, W. S.: Potassium Deficiency in Diabetic Acidosis, J.A.M.A., in press.

hour, and that 200 cc. of orange juice be given on the half hour. Since the carbohydrate content of orange juice averages 13.1 per cent, the patient receives roughly 26 Gm. of carbohydrate each hour.

As a rule, the blood and urine are normal or are approaching normal after four to five hours of this form of therapy. The diabetic diet and the insulin dose calculated to meet the patient's normal requirements may be started shortly thereafter.

### *Acidosis in the Pre-Comatose State*

The prognosis in this group is usually quite good, provided adequate replacement therapy is promptly and vigorously instituted. As a rule the patient has had marked glycosuria for several days, as a result of taking inadequate amounts of insulin and indulging in dietary indiscretions. Frequently some severe infection is present and the patient has not increased his dose of insulin to compensate for it. Polydipsia and polyuria are usually present for several days and are then followed by oliguria, nausea, vomiting, somnolence and stupor. Upon examination signs of dehydration—inelasticity of the skin, dry mucous membranes, and softening of the eyeballs—may be noted. Frequently signs of shock, such as hypotension, hypothermia, and coldness of the extremities, are present. The characteristic labored respiration—the so-called Kussmaul breathing—is noted, and the mephitic, sweetish acetone breath may be detected upon entering the patient's room.

The white cells of the blood are increased in number and the blood sugar is elevated to 300 mg. per 100 cc. or more. The carbon dioxide capacity of the serum is usually less than 25 vols. per cent and may reach values of 4-5 vols. per cent. The plasma sodium and chloride are also reduced. The urine gives a 4 plus reaction for sugar, acetone, and diacetic acid, and contains albumin (approximately 1 plus); microscopically large granular casts (renal failure casts) are seen.

It is universally accepted that insulin in large amounts must be given, and that replacement of the depleted stores of fluid and electrolytes is mandatory. No general agreement on the use of alkalis and glucose has been reached(2). The following regimen of treatment is suggested for this group of patients.

(1) Blood is obtained immediately for determination of the blood glucose and the serum carbon dioxide capacity; these tests are repeated at intervals of two hours.

(2) A urine specimen must be obtained every hour, even if catheterization is necessary. Sugar, acetone, and diacetic acid determinations are made on this.

(3) The patient is made comfortable in bed and surrounded by hot water bottles. Excessive temperature and electric pads should be avoided.

(4) Gastric lavage is done soon after the patient arrives on the ward. A small amount of normal saline (100-200 cc.) may be left in the stomach.

(5) A small, warm saline enema should be given after insulin and fluids have been started.

(6) Unmodified or crystalline insulin should be given immediately. The initial dose should be 100 units injected subcutaneously in two or more sites. This amount should be repeated at the end of one hour. The dose after the second hour depends upon the clinical improvement of the patient and the blood and urine findings. However, some insulin should be given every hour until recovery has taken place. Usually the third dose is 50 units, and each succeeding dose 25 units. If large amounts of sugar are present in the urine, the larger dose may be continued. The dose of insulin cannot be calculated in advance for any case. In our opinion the slower acting insulins are not desirable in the treatment of acidosis.

(7) The administration of fluids must be prompt. Sodium chloride in the form of normal saline solution should be started at once by hypodermoclysis in each thigh, and should be given continuously until absorption of the fluid stops, or until the patient is able to take and retain fluids by mouth. Usually 4000-6000 cc. may be given by this route.

One thousand to two thousand cubic centimeters of normal saline may be given by the intravenous route, usually at the rate of 750-1000 cc. per hour.

Glucose is usually not necessary during the first two or three hours of treatment, although we do not hold with the idea that any great harm can result from its administration, provided ample amounts of insulin are given. After the third hour of treatment

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2. (a) Root, H. F.: The Use of Insulin and the Abuse of Glucose in the Treatment of Diabetic Coma, J.A.M.A. 127:557-564 (March 10) 1945.
(b) Hartmann, A. F.: Treatment of Severe Diabetic Acidosis; A Comparison of Methods with Particular Reference to the Use of Racemic Sodium Lactate, Arch. Int. Med. 56:413-434 (Sept.) 1935.

glucose should be given to compensate for the inadequate storage of glycogen in the liver, and to avert the danger of unrecognized insulin reactions. It is recommended that 1000 cc. of 10 per cent glucose be given intravenously, and that this dose be repeated in three hours if the patient is still unable to retain liquids by mouth.

Alkalis may be given in the form of sixth molar lactate. In the treatment of the *adult* we have found that the amount recommended by Hartmann(2b) is too great, since an occasional patient may develop uncompensated alkalosis. At Duke Hospital we have not found that the mortality rate is decreased by the use of sixth molar lactate. If this substance is employed, care must be exercised in interpreting the plasma carbon dioxide combining power; a high value does not necessarily reflect the true state of depletion in the patient, and vigorous therapy may be stopped short of recovery.

(8) If the syndrome of shock persists after two hours, the patient should be given a transfusion of whole blood. Usually 500 cc. are adequate, but occasionally an additional 500 cc. may be necessary.

(9) Constant observation by competent observers is essential. *The patient should never be left unattended.*

When the patient recovers sufficiently so that he is able to take and retain fluids by mouth, all parenteral fluids should be discontinued. Orange juice and broth may now be given according to the regimen outlined for patients with slight acidosis. The regular calculated diabetic diet is usually withheld for approximately twenty-four hours after the patient has recovered from the acidosis.

### *Acidosis in Deep Coma*

We have defined the patients that fall into this group as those who cannot be aroused by painful stimulation. The history of these patients is very similar to that of patients with pre-comatose acidosis, except that the acidosis has been present longer and they have been unresponsive for several hours. The prognosis is exceedingly grave and depends upon the length of time the patient has been in coma.

Physical examination reveals all of the signs present in the pre-comatose group and, in addition, profound shock. The patients cannot be aroused from coma even by painful stimulation. The laboratory findings in the blood and urine are similar to those of the pre-comatose patients, although the changes may be greatly exaggerated. The blood sugar may be above 800 mg. per 100 cc. or may be lower than 300 mg. per 100 cc. The carbon dioxide combining power of the serum is usually around 15 vols. per cent, but it is not rare to see values as high as 25 vols. per cent. In addition to the depletion of the water from the extracellular and intracellular stores there is a great loss of the electrolytes, particularly the sodium and chloride ions, and in some patients the potassium ion. Potassium may be further depleted by the administration of insulin and fluids as outlined above(1,3).

The therapy outlined for the pre-comatose group is to be employed for these patients, the one difference being that they should receive potassium chloride. This drug should not be started until two to three hours after the beginning of treatment. If the patient at this time is able to swallow, the drug should be given by mouth every hour in doses of 0.6 Gm. until approximately 5 Gm. have been given. If the parenteral route must be followed, the potassium chloride may be given intravenously in the form of a 10 per cent solution. The initial dose should be 2 Gm. and this dose should be repeated in two hours. Where the facilities are available, the serum potassium concentration should be followed throughout the patient's recovery from coma.

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3. Holler, J. W.: Potassium Deficiency Occurring During the Treatment of Diabetic Acidosis, J.A.M.A. 131:1186-9 (Aug. 10) 1946.

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# THE PRESCRIBING OF DIETS IN THE TREATMENT OF DIABETES MELLITUS

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An adequate dietary regimen is an essential part of good diabetic therapy. The average diabetic patient taking insulin has to keep the carbohydrate content of his meals relatively constant from day to day to avoid insulin reactions on one hand and hyperglycemia with glycosuria on the other. Well designed diets are equally important when mild diabetes is controlled by low-carbohy-

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drate diets without insulin, or by weight reduction if the patient is obese. The inability of the average physician to handle dietary problems is an outstanding cause for much slipshod diabetic treatment.

### *Changing Concepts of Metabolism*

Recent developments in our knowledge of metabolism permit diabetic diets to be prescribed on a simpler basis than formerly. Fats are no longer thought to burn in the fires of carbohydrates(1). It is now known that insulin deficiency simply leads to impaired oxidation of glucose. Protein and fats have then to be used disproportionately to meet caloric or energy requirements. While it has been thought in the past that 10 per cent of the fat metabolized and about half of the protein requires the use of insulin, it is now uncertain that insulin is required for the metabolism of these fractions(2). The carbohydrate content of the diet is accordingly the principal concern in diabetic therapy. The ratio of carbohydrate, protein, and fat to one another is unimportant except as it affects the palatability of the diet. In short, there is no scientific basis for a diabetic diet other than one resembling a well selected general diet, with perhaps a moderate reduction in carbohydrate content.

### *Dietary Extremes*

Many different plans varying in complexity and practicality have been proposed for prescribing diabetic diets and instructing the patients in their use. The old-style, weighed diets, prescribed on the basis of fixed ratios in arbitrary quantities, are still used in some quarters. While the therapeutic results are good in terms of temporary diabetic control in the hospital, lapses in treatment on the outside and outright refusal to cooperate are all too common, for patients soon discover that following a restricted and monotonous diet may be a greater curse than the uncontrolled disease.

At the other extreme are the so-called "free" diets advocated by those dissatisfied with the annoying and perhaps needless restrictions of the old regimens(3). In some clinics where "free" diets are used all dietary restrictions have been abandoned, while in others only a few general quantitative rules are given(4). With unrestricted diets greater degrees of glycosuria and hyperglycemia are expected and permitted, partly because they are necessary in order to avoid hypoglycemic reactions. Adequate studies of survival rates and the incidence of remote complications in patients treated in this manner have not as yet been made.

### *Individual Diet Prescription*

Several years of experience in treating the average run of diabetic patients, as well as many with severe and unstable diabetes(5), has convinced me that individual diets are superior to all others. These diets are easily applied; they are easily understood, are pleasing to the patients who use them, and permit meticulous diabetic control.

The first step in individual diet prescription is to investigate some aspects usually ignored—the types of food available at home, the quantities desired, and the patient's likes and dislikes. From the dietary history obtained one can estimate the quantities and types of food that are practical to use. There is no point in including in a diet foods that are not available or that will not be eaten. It is ill advised to recommend radical changes in dietary habits, although adjustments may be necessary occasionally to have adequate nutrition.

All diets should contain in the day's food a pint or more of milk to provide enough calcium; fresh tomatoes, tomato juice, or a citrus fruit to supply vitamin C; two raw, green leafy or yellow vegetables; and at least 60-70 Gm. of protein. After these basic requirements are met, food items should be used in the diabetic diet according to the usual pattern set by family customs and economic factors.

#### *The mechanics of individual diet prescription*

The mechanics of individual diet prescription are made immeasurably easier if printed charts and forms similar to those illustrated are conveniently at hand. The basic foods easiest to use in a diabetic diet are the plain, simple foods of relatively constant composition, such as lean meat, eggs, milk, bread, butter, cream, fruits and vegetables. The

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1. Stadie, W. C.: Intermediary Metabolism in Diabetes Mellitus, Bull. New York Acad. Med. 19:778-80 (Nov.) 1943.
2. Soskin, S., and Levine, R.: Carbohydrate Metabolism, Chicago, University of Chicago Press, 1946.
3. Tolstoi, E. and Weber, F. C., Jr.: Protamine Zinc Insulin: A Clinical Study, Arch. Int. Med. 66:670-678 (Sept.) 1940.
4. Joslin, E. P.: Diabetes Mellitus, New England J. Med. 234:476 (April 4) 1946.
5. Rundles, R. W.: Diabetic Neuropathy, Medicine 24:111-160 (May) 1945.

**Table 1. Composition of Food**

| Food | Weight (grams) | Protein (grams) | Fat (grams) | Carb. (grams) | Calories |
|---|---|---|---|---|---|
| Egg, average size | 50 | 6.5 | 6 | | 80 |
| Lean meat, cooked | 60 | 18 | 3.6 | | 105 |
| Medium fat meat, cooked | 60 | 15 | 11 | | 160 |
| Bacon, crisp | 30 | 6 | 15 | | 160 |
| Cheese: cheddar, process | 50 | 12 | 16 | 1 | 195 |
| cottage | 100 | 19 | 1 | 4 | 100 |
| Bread, large slice | 30 | 3 | 1 | 15 | 80 |
| Crackers | 20 | 2 | 2 | 15 | 85 |
| Cereal, average portion | 20 | 2 | | 15 | 70 |
| Milk (8 oz., ½ pt.) | 240 | 8 | 9 | 12 | 160 |
| Skimmed milk | 240 | 8 | | 12 | 80 |
| 20% cream | 30 | 1 | 6 | 2 | 66 |
| Fruit or vegetables, 3% | 100 | | | 3 | 12 |
| Fruit or vegetables, 6% | 100 | 1-2 | | 6 | 28 |
| Fruit or vegetables, 12% | 100 | 1-3 | | 12 | 52 |
| Butter, margarine | 10 | | 9 | | 81 |
| Salad oil | 30 | | 30 | | 270 |
| Cakes, angel | 100 | 8 | | 59 | 270 |
| fruit, pound | 100 | 6 | 19 | 53 | 405 |
| Cookies, plain | 100 | 7 | 15 | 70 | 440 |
| figbars, gingersnaps | 100 | 5 | 7 | 76 | 390 |
| Dried fruit, dates, figs, raisins, prunes | 100 | 3 | 1 | 75 | 320 |
| Gelatin, plain | 100 | 86 | | | 345 |
| Ice cream | 100 | 4 | 13 | 20 | 210 |
| Milk chocolate | 100 | | 34 | 55 | 530 |
| Nuts: | | | | | |
| Almonds | 100 | 19 | 54 | 20 | 640 |
| Brazil nuts | 100 | 15 | 66 | 11 | 695 |
| Peanuts and peanut butter | 100 | 26 | 46 | 22 | 605 |
| Pecans | 100 | 9 | 73 | 13 | 740 |

**Table 2**

**Outlines for individual diets varying in carbohydrate content and caloric yield. One-fifth of the total carbohydrate is given at breakfast. The noon and evening meals are equal. The quantities of food used are common amounts suitable for attractive servings. Fruits and vegetables are indicated in terms of total grams of carbohydrate from these sources per meal.**

| | 1200 Cal.<br>100 C.<br>57 P.<br>68 F. | | 1200 Cal.<br>150 C.<br>65 P.<br>40 F. | | 1600 Cal.<br>125 C.<br>70 P.<br>91 F. | | 1600 Cal.<br>175 C.<br>72 P.<br>71 F. | | 2000 Cal.<br>150 C.<br>90 P.<br>115 F. | | 2000 Cal.<br>225 C.<br>90 P.<br>84 F. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E |
| Eggs | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 | 1 | 3 |
| Milk | | 240 | | 240* | 240 | 240 | 120 | 240 | 120 | 240 | 120 | 240 |
| Bread | 15 | 15 | 30 | 30 | 15 | 30 | 30 | 60 | 30 | 45 | 45 | 60 |
| Butter | 5 | 10 | 5 | 5 | 10 | 10 | | 10 | 10 | 20 | 10 | 10 |
| 20% Cream | 15 | | | | 15 | 30 | 30 | | 30 | 30 | | |
| Fruits and Vegetables | 12 | 20 | 15 | 30 | 4 | 21 | 12 | 28 | 10 | 23 | 16 | 48 |

* Skimmed milk

| | 2400 Cal.<br>150 C.<br>90 P.<br>160 F. | | 2400 Cal.<br>225 C.<br>100 P.<br>120 F. | | 2800 Cal.<br>200 C.<br>110 P.<br>171 F. | | 2800 Cal.<br>250 C.<br>112 P.<br>150 F. | | 3200 Cal.<br>250 C.<br>114 P.<br>195 F. | | 3200 Cal.<br>300 C.<br>119 P.<br>170 F. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E | Br. | N & E |
| Eggs | 1 | 3 | 1 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| Milk | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |
| Bread | 30 | 45 | 45 | 60 | 30 | 60 | 45 | 60 | 45 | 60 | 60 | 60 |
| Butter | 15 | 30 | 15 | 20 | 20 | 20 | 10 | 20 | 20 | 30 | 20 | 25 |
| 20% Cream | 60 | 45 | 30 | 15 | 60 | 90 | 60 | 60 | 90 | 90 | 60 | 60 |
| Fruits and Vegetables | 3 | 21 | 8 | 46 | 8 | 32 | 12 | 54 | 9 | 52 | 17 | 74 |

(Br.=breakfast; N.=noon; E.=evening.)

composition of these foods, as well as that of high-calorie items less commonly allowed, is given in table 1[6].

With the general food requirements of an individual in mind, outlines of representative diets of different caloric yield and carbohydrate content can be followed as a guide in dividing the diet into meals and specific food items (table 2). The quantity of protein foods is indicated in terms of egg equivalents, and items within the protein, bread-cereal, or fatty-food groups may be interchanged freely (table 3). Unsweetened fruits and vegetables can be prescribed most easily in terms of total grams of carbohydrate from these sources per meal, the carbohydrate content being estimated from measured servings as shown in table 4[7]. This arrangement allows for the widest possible choice and variety in the diet, as well as for a proper adjustment when the choice is extremely limited—as, for instance, when

**Table 3. Food Substitution Equivalents**

**Protein Foods. Substitution Equivalents for 2 Eggs.**

| | Wt. (Gm.) | Measure |
|---|---|---|
| Meat, cooked | 60 | 2″ x 4″ x ½″ |
| Fish, cooked or canned | 60 | 2″ x 4″ x ½″ |
| Bacon, cooked crisp | 30 | 4½ strips |
| Cheese, cheddar, process | 50 | 2″ x 3″ x ½″ |
| Cheese, cottage | 65 | 4 tbsp. |
| Peanut butter | 30 | 2 level tbsp. |

**Bread-Cereal Foods. Substitution Equivalents**

| | Wt. (Gm.) | Measure |
|---|---|---|
| Bread | 30 | 1 large slice |
| Crackers | 20 | 5. 2″ square |
| Cereal: cooked (20 Gm. dry) | 100 | scant ½ cup |
| All-Bran | 20 | ⅓ cup |
| Cornflakes | 20 | ¾ cup |
| Grapenuts | 20 | ⅛ cup |
| Krumbles | 20 | ⅓ cup |
| Pep | 20 | ⅔ cup |
| Puffed Rice | 20 | 1½ cups |
| Puffed Wheat | 20 | 1½ cups |
| Rice Krispies | 20 | ⅔ cup |
| Shredded Wheat | 20 | ⅔ biscuit |

**Fatty Foods. Substitution Equivalents**

| | Wt. (Gm.) | Measure |
|---|---|---|
| Butter | 10 | 1 pat, 2 tsp. |
| Margarine | 10 | 1 pat, 2 tsp. |
| Mayonnaise | 10 | 2 tsp. |
| French dressing | 15 | 3 tsp. |
| Salad oil | 10 | 2 tsp. |
| Lard, bacon fat, Crisco | 10 | 2 tsp. |
| 20% Cream | 45 | 1½ oz. |

Name ______________________ Hgt. ________ Wgt. ________ Occupation ______________________

Diet ______________________ cal. ________ Pr ________ carb. Date: ______________________

| BREAKFAST | Amount | DINNER and SUPPER | Amount | BEDTIME | Amount |
|---|---|---|---|---|---|
| Fruit or Juice | | (Broth, clear soup) | | | |
| Eggs | | Eggs (Meat) | | | |
| Milk | | Milk | | | |
| Bread | | Bread | | SPECIAL FOOD SUBSTITUTES— | |
| Butter | | Butter | | | |
| Cream | | Cream | | | |
| (Coffee) | | Fruit and Vegetables | | | |
| or | | | | INSULIN DOSAGE: | |
| | | | | Morning | |
| | | | | Noon | |
| | | (Coffee, Tea) | | Night | |

Chart 1. Individual Diet Instruction Card

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6. (a) Bowes, A. D. and Church, C. F.: Food Values of Portions Commonly Used, ed. 5, Anna de planter Bowes, 311 S. Juniper St., Philadelphia 7, 1945.
   (b) Chatfield, C. and Adams, G.: Proximate Composition of Anerical Food Materials, U. S. Dept. Agriculture Circular no. 549, 1940.
7. Diet Manual of University Hospital, Ann Arbor, George Wahr, 1945.

Table 4. Carbohydrate Content of Fruits and Vegetables Estimated by Measured Servings

| 0 to 3 Per Cent Carbohydrate | 3 Per Cent Carbohydrate | 6 Per Cent Carbohydrate | 9 Per Cent Carbohydrate | 12 Per Cent Carbohydrate | 15 Per Cent Carbohydrate | 18 Per Cent Carbohydrate |
|---|---|---|---|---|---|---|
| Gm. Carbohydrate per serving: | ⅓ cup=2<br>½ cup=3 | ⅓ cup=4<br>½ cup=6 | ⅓ cup=6<br>½ cup=9 | ⅓ cup=8<br>½ cup=12 | ⅓ cup=10<br>½ cup=15 | ⅓ cup=12<br>½ cup=18 |
| **Vegetables:**<br>Bean sprouts<br>Beet greens<br>Cabbage, raw<br>Chinese cabbage<br>Celery<br>Chicory<br>Cucumber<br>Endive<br>Escarole<br>Lettuce<br>Mushrooms<br>Mustard greens<br>Pickles, sour, dill<br>Radishes<br>Sorrell<br>Spinach<br>Summer squash<br>Turnip greens<br>Water cress<br>**Fruits:**<br>Rhubarb<br>(This group need not be weighed or measured.) | **Vegetables:**<br>Asparagus<br>Broccoli<br>Cabbage, cooked<br>Cauliflower<br>Chard<br>Sauerkraut<br>Tomatoes<br>Tomato juice | **Vegetables:**<br>Beans, green<br>Beans, wax<br>Chives<br>Collards<br>Dandelion greens<br>Eggplant<br>Kale<br>Kohlrabi<br>Lambsquarters<br>Leeks<br>Okra<br>Pepper, green<br>Pepper, red<br>Pumpkin<br>Turnips<br>**Fruits:**<br>Melons—<br>Cantaloupe<br>Honeydew<br>Spanish<br>Watermelon<br>Strawberries | **Vegetables:**<br>Artichokes<br>Beets<br>Brussel sprouts<br>Carrots<br>Onions<br>Parsley<br>Rutabagas<br>Squash, winter<br>**Fruits:**<br>Blackberries<br>Cranberries<br>Currants<br>Gooseberries<br>Grapefruit<br>Grapefruit juice<br>Lemons<br>Limes<br>Tangerines | **Fruits:**<br>Applesauce<br>Apricots<br>Cherries, sour<br>Kumquats<br>Loganberries<br>Mulberries<br>Oranges<br>Orange juice<br>Peaches<br>Pineapples<br>Pineapple juice<br>Plums<br>Quince<br>Raspberries | **Vegetables:**<br>Beans, red kidney<br>Parsnips<br>Peas<br>Salsify<br>Hominy, cooked<br>**Fruits:**<br>Apples<br>Blueberries<br>Grapes<br>Huckleberries<br>Mangoes<br>Nectarines<br>Pears | **Vegetables:**<br>Potatoes<br>Macaroni, cooked<br>Noodles, cooked<br>Spaghetti, cooked<br>**Fruits:**<br>Cherries, sweet<br>Figs, fresh<br>Grape juice<br>Prune juice<br>**21 Per Cent Carbohydrate**<br>⅓ cup=14<br>½ cup=21<br>Beans, baked<br>Beans, fresh lima<br>Black-eyed peas, fresh<br>Corn, fresh<br>Rice, cooked<br>Yams<br>Bananas<br>Prunes, fresh |

the only vegetable available for a particular meal is potatoes.

As quantities adapted to the needs and preferences of a particular patient are chosen, they are entered on the individual diet card (chart 1). Absolute quantities in most cases are less important than constancy in amount and distribution of carbohydrate from day to day. The total amount of food needed is determined over a period of time by the quantity required to maintain the individual's body weight at or slightly below the optimal level.

### *General rules*

In dealing with obese patients with gluttonous appetites, where the prescription of a reduction diet may jeopardize cooperation, it is better judgment to satisfy the food desires, maintain control of the diabetes, and allow the obesity to persist; for diabetes is a more serious disease than obesity. In the treatment of mild diabetes by low-carbohydrate diets without the use of insulin, the meals become unattractive when the carbohydrate content of a 2000-calorie diet is less than about 150 Gm., and that of a 3000-calorie diet below about 200 Gm. In some cases the patient may have to decide between less attractive food without insulin and a better diet with insulin.

Every effort should be made to avoid unnecessary restrictions in diabetic diets. Whole wheat bread, for instance, is commonly prescribed routinely. Enriched white, rye, or even hot breads, if properly estimated as to carbohydrate content, can be used equally well. The fruits and vegetables containing less than 3 per cent carbohydrate—and in many cases those through the 6 per cent groups—can be used in virtually any quantity. Black coffee, tea, lemonade made with saccharin, broth, clear soup, and average servings of oysters and clams can also be used without regard to food content. Cold lunches are easily adapted from the allowed food when desired. Bedtime lunches are usually advantageous when protamine-zinc insulin is used, and these lunches often satisfy natural desires as well.

It is important finally that the patient be made to understand the reasons for his dietary regimen, and not merely be given a set of arbitrary directives, if sustained cooperation is to be expected.

# SOME COMMON FORMS OF OVERTREATMENT

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It is not the purpose of this article to discuss toxicology. It is well known that the use of drugs is attended by dangers, and physicians are keenly aware of these dangers, such knowledge being part of their training. On the other hand, prolongation of therapy often results in minor changes which are not so easily recognized or anticipated, but may do harm—not only by confusing diagnosis, but by retarding healing and return of normal function. It is with this aspect of treatment that I propose to deal by illustrative examples.

## *Local Treatment*

Suppose that an individual is confronted by a single symptom—namely, itching. This is a very common symptom, and equally so is the usual therapy for it—scratching. In many cases this will relieve the symptom, and that is the end of it. If, however, because of lack of judgment or emotional tension or simple absent-mindedness, the sufferer continues to scratch, it may be said that he has overtreated the condition. The result will be excoriation of the skin, and the chances are that the symptom will thereby be increased rather than diminished. The sufferer may then present himself to a physician, and the diagnosis is probably not itching from the original cause—whether an insect bite or something else that may have long since healed of itself—, but traumatic dermatitis.

This easily understandable train of events illustrates the principle involved. The treatment of minor skin ailments may take other forms. Self-medication by various salves, ointments, antiseptics, and lotions prescribed by one's friends may often be prolonged to the point of slowing down and interfering with the natural healing processes of the body. One often wonders how our dermatologic colleagues are able to make diagnoses when the patient has so modified the original lesion by haphazard and prolonged topical treatment that the presenting condition is chiefly a chemical or an excoriative dermatitis.

As an extension of the above principle, the topical treatment may have been prescribed by the physician to the patient, but he may have failed to warn him to stop it after a certain time and give the skin a chance to heal. One is inclined to assume that the patient will use good judgment, but too often this assumption proves to be a mistake.

The same principle may apply in the treatment of sore mouth. Stomatitis is a condition that may arise for various reasons: lack of cleanliness, digestive disturbances, a rough edge on a tooth, malnutrition, acute infection, the taking of unclean articles and foreign bodies into the mouth, or vitamin deficiency. The physician attempts to find the underlying cause and to treat that appropriately. There remains then to be treated the presenting symptom, a painful mouth. Commonly it is advised that a mouthwash be used. Most mouthwashes contain antiseptics, which may have irritating properties to a greater or less degree. Treatment is instituted, and the patient gets better. He frequently attributes his improvement to the local treatment, and keeps on with this. At the same time he is apt to worry with his mouth, putting his tongue here and there and feeling out the sore places to see how they are getting along. Of course his attention has been directed to his mouth in the first place, and he may be said to have a *fixation* on that part of his body. This fact must always be kept in mind in the topical treatment of any condition. In this particular case it would be far better to use a simple mouthwash such as plain water or 0.9 per cent salt solution, and to divert the patient's mind while impressing upon him the importance of not overtreating the condition.

An allied condition is herpes labialis. A common form of therapy is to apply alcohol, and this is usually successful. If the patient keeps on using it without regard to the side effects, however, he may produce a secondary condition that will give further trouble.

## *Laxatives*

Perhaps the commonest form of overtreatment is in the matter of movement of the bowels. Deeply imbedded in our culture seems to be the necessity of moving the bowels every day. It is very hard to disabuse a patient's mind of this article of faith. It

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shocks him to be told that he could go several days without having a bowel movement, although we all know that it is unlikely that any permanent harm would result. Not believing this, the patient takes a purge and has a bowel movement. He feels fine. Then —to his surprise, but not to ours—he goes for a day or a day and a half without any inclination to move his bowels. To be sure, they have been purged, and are naturally now relaxed. There is no mechanical stimulus to further peristalsis. But the fact that is uppermost in the patient's mind is that he has not had a movement. Again he takes the purge, and the same thing happens.

Further elaboration is not necessary. One clearly sees the development of a train of events: purgation, resting bowels (mistakenly called constipation), and a repeat performance. This is a clear-cut case of overtreatment due to lack of knowledge on the part of the individual. Instruction is the answer.

### *Nasal Vasoconstrictors*

Perhaps the most fashionable form of overtreatment in the present decade is the use of nasal vasoconstrictors(1). Prompt relief for congestion of the mucous membrane of the nose is obtained by the use of these drugs. The primary effect is vasoconstriction, and the swollen turbinates shrink down in a dramatic and gratifying fashion. Unfortunately, this primary effect is followed by a secondary vasodilatation, which is often increased by the addition of one of the sulfonamides to the solution used. Because of the relief obtained immediately after application, however, the patient tends to use the medication again and again. It has been clearly pointed out that vasoconstrictor drugs may of themselves produce a rhinitis which is indistinguishable from one due to allergy. The use of nasal vasoconstrictors undoubtedly has its place, but they must be used sparingly. When they are prescribed, it is important that the effects of prolonged treatment be kept in mind and that the patient be instructed to watch for these.

### *Sedatives*

The importance of warning the patient that symptomatic treatment must not be continued indiscriminately may further be illustrated in the use of sedatives. Where bromides are employed, there is danger that they will replace the chloride of the body, producing serious disturbances of the skin, and of the sensorium. The latter may even become delirium. In general there is no need that these disturbances should come about. A sedative should accomplish its purpose before such a state is reached; otherwise it is clear that supplementary treatment is indicated. Often the necessity for supplementary treatment may not be apparent at the first examination, because tension is the presenting symptom. The sedative prescribed, whether bromide or one of the barbiturates, will probably relieve that symptom, but it carries the same danger as the giving of morphine to a patient with an undiagnosed acute abdominal condition: the diagnosis is obscured.

One must always regard the use of a drug as a diagnostic as well as a therapeutic procedure. Explain that a sedative should take effect promptly, but should be discontinued after a matter of four to five days. Let the patient then observe his reactions without the sedative. In many cases the tension may have been relieved by the examination and the treatment prescribed, and will not return. If it does return, a more accurate diagnosis is called for. The important thing is to instruct the patient to break the course of treatment and to observe himself, reporting to the physician any change in his symptoms. This instruction serves another purpose—that of weaning him from dependence upon the drug.

### *Bed Rest*

The above examples serve to illustrate common forms of overtreatment. We turn now to the subject of bed rest. More and more we are becoming aware that bed rest is overdone. The treatment of acute rheumatic fever furnishes an example. This is a serious disease, and the patient must be kept in bed during the entire period of infection. It is the physician's duty to see that the evidence of infection has disappeared—that the patient has no fever and that the white blood cell count and sedimentation rate have returned to normal. Thereafter he should make it his duty to get the patient out of bed. If this is not done, the muscles

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1. (a) Kully, B. M.: The Use and Abuse of Nasal Vasoconstrictor Medications. J.A.M.A. 127:307-310 (Feb. 10) 1945; (b) Feinberg, S. M. and Friedlaender, S.: Nasal Congestion from Frequent Use of Privine Hydrochloride. J.A.M.A. 128:1095-1096 (Aug. 11) 1945.

of the body, as well as the myocardium, become weakened by rest and the process of recovery is prolonged. In some cases patients have stayed in bed for years following one attack of acute rheumatic fever.

There is also evidence that the same abuse of rest is occurring in cases of heart disease in older people. Even patients with coronary occlusion should probably be gotten out of bed sooner than has been customary. Many physicians will disagree with this statement, but evidence is accumulating that it is the case. It is far too easy to make a cardiac invalid out of a person by keeping him in bed too long.

The entire subject of the abuse of bed rest was discussed in a symposium on therapy recently(2). It was pointed out that the bed as a therapeutic device is usually taken for granted, and that insufficient consideration is given to the dangers of going to bed. Prolonged confinement in bed is in direct conflict with physiologic principles. It creates problems. The effect on morale is not the least important one, and the patient who "looks longingly at a chair" should probably be allowed to use it. There are gastro-intestinal problems—distention, and the common objections to the bedpan. Backaches and muscle cramps result from abnormal pressure when the patient is in bed. There are pulmonary and circulatory problems—the latter particularly in patients with heart failure(3).

This group of physicians, in discussing the subject, pointed out that sitting in a chair quietly is as effective as lying in bed in many cases, and that patients are often less restless. The particular problem of coronary thrombosis was brought up. In general a minimum of six weeks in bed is prescribed, but there seems to be considerable doubt that even this is always necessary. Except in the most acute phase of the disorder, the greater freedom of sitting in a chair might materially improve the condition of the patient. The formation of thrombi in the veins of the legs is one of the more serious complications of bed rest. When one is forced to prescribe bed rest, he should not forget that moving the legs with reasonable frequency may prevent this serious complication.

### *Conclusion*

No doubt every physician is aware of the types of overtreatment touched on in this paper. Many more instances could be cited, and no doubt each reader will bring to mind some particular example. The principles involved are in general the same, although in the case of bed rest there are unusual dangers, and it is here that the judgment of the physician is most important in deciding what is best to be done. The experienced practitioner learns to consult with the patient in making these decisions, and this is a good course to follow. The inclination of the individual is not lightly to be disregarded.

As for the overenthusiastic use of drugs, the physician's judgment of the personality of the patient using the drug is here the touchstone. The sensible person will not indulge in overtreatment, while the too dependent individual will tend to cling to the drug prescribed by the physician. It is better to err on the side of overinstruction than to assume that the patient will use good judgment.

Physicians are often warned to remember that they are treating sick human beings rather than a disease. It is well to recall here the words of Withering: "It is much easier to write upon a disease than a remedy. The former is in the hands of nature and a faithful observer with an eye of tolerable judgment cannot fail to delineate the likeness; the latter will ever be subject to the whims, the inaccuracies and the blunders of mankind." Fashion and publicity modify and are responsible for various types of treatment. They do not prevent the effects of overtreatment; indeed, they may serve to increase their incidence.

### *Summary*

Most therapeutic measures are double-edged swords; they can do harm as well as good. Prolonged use is one of the ways in which harm may be done. Some common examples of this form of overtreatment are discussed.

**For centuries, scratching an itch** has been one of the pleasures as well as a curse of humanity. One of the King Georges of England is credited with the statement that "only kings should have the itch, since it is such a kingly pleasure to scratch." While the psychic background of pruritus is well known, the mechanical, bacterial and chemical stimuli to itching are more frequent. But the diagnosis pruritus without limiting or descriptive additions is still good form, even a necessity in many instances.—Herbert Alden and Jack W. Jones: Neurodermatitis, Am. Practitioner 1:152 (Nov.) 1946.

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2. On the Use and Abuse of Bed Rest. Cornell Conferences on Therapy, vol. 1, New York, The Macmillan Company, 1946.
3. Harrison, T. R. et al.: Symposium on the Abuse of Rest in the Treatment of Disease, J.A.M.A. 125:1075-1092 (Aug. 19) 1944.

# THE SIGNIFICANCE OF HYPERSENSITIVITY IN DIAGNOSTIC TESTS AND IN THE THERAPY OF INFECTIOUS DISEASES

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The importance of hypersensitivity in asthma, hay fever, and tuberculosis is recognized by all physicians. The clinical syndromes of asthma, hay fever, and urticaria result entirely from the explosive reactions of certain tissues to materials which are harmless to the normal individual. Such a pattern of reactivity, which is not only useless but actually harmful to an allergic patient, is closely related to the basic mechanism of immunity which protects man from extinction when he is infected by pathogenic bacteria, viruses, or fungi.

### *Types of Antibody Reaction*

Serum sickness is a classic example of a disease in which all the clinical manifestations result from a too-rapid production of antibodies by the immune mechanism in its effort to eliminate the offending foreign protein from the body of the patient. Some individuals succeed in producing antibodies and in eliminating the foreign serum without developing symptoms. Such a type of reaction is obviously the most desirable for the patient, and is analogous to a subclinical infection in which the infecting agent is eliminated without the development of symptoms and yet resistance is acquired to subsequent infections with the same pathogenic organism.

A few individuals(1) seem to lack the ability to produce antibodies to horse serum; the foreign protein circulates in the blood for months, and serum sickness does not develop. In such instances the failure to eliminate the horse serum by antibody formation is not dangerous, because the serum itself is harmless and gradually disappears. However, if such an individual were infected with a living virus or bacterium, he probably would succumb quickly to the infection because of his inability to produce antibodies.

Thus, the clinical manifestations following the parenteral introduction of foreign serum into the human body can be classified as follows: (1) the normal, or moderate, reaction; (2) the hypersensitive reaction; and (3) the hyposensitive reaction. In the normal, or moderate, reaction, antibodies are produced, the foreign serum is eliminated, and few, if any, symptoms appear. In the hypersensitive person antibody is produced in quantity and the foreign serum is eliminated, but the patient becomes violently ill in the process. In the hyposensitive patient few, if any, antibodies are produced; there is no conflict between antigen and antibody, and serum sickness does not occur. In any series of cases all gradations from hypersensitive to hyposensitive reactions may be observed.

In naturally acquired infectious diseases of man, the problem is much more complicated than in an artificially produced disease such as serum sickness. In natural infections, the foreign protein is a part of a living, multiplying virus, bacterium, fungus or parasite, and the disease is complicated further because some of the infecting agents secrete exotoxins and others contain endotoxins. In many instances, however, the hypersensitive reactor can be detected and the course of his disease can be modified by desensitization.

Before discussing practical methods of desensitization we must return again to our study of serum sickness. In most instances of serum sickness, whether subclinical or clinical, the tissue cells of the body after recovery are altered in such a manner that a second injection of the same foreign serum results in new symptoms, characterized by an onset which is sudden and often violent. The intravenous injection of the specific serum may produce an anaphylactic type of reaction, while the subcutaneous or intramuscular injection of the same material may result in the actual necrosis of tissues—the "Arthus phenomenon." On the other hand, the injection of 0.1 cc. of a 1:10 dilution of the serum intradermally produces in the next twenty to thirty minutes an urticarial wheal which disappears within half an hour, leaving no evidence of injury. Such a skin test, harmless in itself, is valuable in that one can predict which patients would

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1. Longcope, W. T., and Mackenzie, G. M.: The Relation between the Disappearance of Foreign Proteins from the Circulation and the Formation of Antibodies, Proc. Soc. Exp. Biol. & Med. 17:133-136, 1920.

react violently to large doses of the same serum injected intravenously or intramuscularly. Furthermore, a positive skin test indicates that, at some time in the past, the patient has had a clinical or subclinical case of serum sickness.

In contrast to the immediate intradermal reaction indicating previous contact with *serum,* there is another type of reaction to protein which is seen only in patients who have had previous *infections.* In both cases the injected material is harmless to those who have had no previous contact with the specific protein. The delayed types of reaction differ from the immediate in that the tissue cells at the site of the skin test are damaged or destroyed. This destruction of body cells due to tissue hypersensitivity should not be confused with the destruction of body cells by direct action of toxin, as is seen in the Schick test.

Although the immediate and delayed types of skin reaction develop under quite different circumstances and although there are marked differences in the mechanisms by which they are elicited, the mechanisms are similar enough so that the physician can be guided by the same general principles in his management of all patients who react in an unusual manner to infecting organisms. Thus, there are hyper-reactors, moderate reactors and hypo-reactors to infectious agents, and, as in serum sickness, the clinical symptoms differ in different patients, even though they all were infected with the same organism.

### *Diagnostic Skin Tests*

There are a number of specific diagnostic skin tests in use which depend upon this principle of specific hypersensitivity of the tissues to the protein of the infecting organism. Among these are tuberculin for tuberculosis, mallein for glanders, brucellergin for brucellosis, histoplasmin for histoplasmosis, coccidioidin for coccidioidomycosis, tularense deaminized bacterin for tularemia, and various bacterial and fungus vaccines. The Frei test is an example of an allergic reaction to a virus infection. Of diagnostic importance also is the immediate type of skin-test reaction seen in certain parasitic diseases such as trichinosis. It should be emphasized that a positive skin test does not prove the presence of active disease. A previous infection, clinical or subclinical, may so greatly sensitize the tissues that a positive skin test may be elicited for many years. This knowledge is of major importance in the study of patients suspected of having brucellosis. Since a positive skin test itself will frequently give rise to agglutinins and increased phagocytosis within a few days, blood should be drawn for agglutination and phagocytic studies before the skin test is performed, to avoid a false conclusion that the patient has active brucellosis.

The Moloney test, while not a diagnostic test for infection, is important practically as a test for individuals who are hypersensitive to diphtheria toxoid(2). Schick-positive individuals who have negative Moloney tests (0.1 cc. of a 1:100 dilution of fluid toxoid) can be given full doses of the toxoid without fear of local or general reactions. Moloney-positive individuals can be rendered Schick-negative by three to six intradermal injections, at weekly intervals, of the toxoid diluted 1:100—that is, by repeated Moloney tests(2).

### *Some Effects of Hypersensitivity*

The increasing local and general reaction to repeated doses of typhoid vaccine is probably another example of hypersensitivity. This problem may be solved by employing small (0.1 cc.) doses of the vaccine intradermally(3).

Recurrent herpes may be an example of hypersensitivity to a virus, analogous to recurrent boils due to staphylococci. Vaccination with vaccinia virus usually gives a marked reaction after twenty-four hours, and repeated vaccinations may desensitize the patient and eliminate the recurrent herpes.

The development of hypersensitivity during the course of an infection may be one of the reasons for the chronicity of certain diseases (tuberculosis and fungus diseases), and may account for the persistence of symptoms in some individuals infected with organisms which cause acute infections in the moderate reactor. The development of hypersensitivity apparently counteracts the effectiveness of the immune bodies, possibly

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2. Bunch, C. P., Morrow, R. C., Jr., Timmons, J. R. and Smith, D. T.: Studies on the Immunization of Adults with Diphtheric Toxoid, J. Immunol. 39:427-440 (Nov.) 1940.
3. (a) Perry, R. M.: Comparison of Typhoid "O" and "H" Agglutinin Responses Following Intracutaneous and Subcutaneous Inoculation of Typhoid, Paratyphoid A and B Vaccine, Am. J. Hyg. 26:388-395 (Sept.) 1937.
   (b) Martin, Donald S.: Intracutaneous vs. Subcutaneous Vaccination, North Carolina M. J. 3:492-495 (Sept.) 1942.

by interfering with the phagocytic mechanism. Recurrent boils frequently respond readily to an autogenous, or even a stock vaccine. Chronic infections of the nasal sinuses, bronchi and lungs, if not conditioned by local mechanical factors, often improve with autogenous vaccines; the hypersensitivity factor should be proved by preliminary skin tests.

One of the best examples of the effect of hypersensitivity in modifying the course of a disease is the hypersensitive type of chronic brucellosis, where the patient is clinically ill, but shows a good titer of agglutinins. Although antibodies are present, sometimes in abundance, they apparently are not effective in eliminating the infection. Such patients have little or no phagocytosis, but strongly positive skin tests to brucellergin. Desensitization with brucellin apparently decreases the hypersensitivity enough to allow the already existing immunity to become effective(4).

4. Smith, D. T. and Poston, Mary A.: Some Unusual Cases of Brucella Infection, Tr. Am. Clin. & Climat. Assoc., 1937.

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# DESENSITIZATION IN THE TREATMENT OF ASTHMA

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There are many phases in the treatment of asthmatic patients. Most reports deal with the symptomatic relief of an attack. Adrenalin, aminophyllin, and the newer antihistamine preparations such as benadryl and pyribenzamine provide the physician with an armamentarium which, when judiciously used, will relieve the paroxysm of dyspnea promptly. Since asthma is noted for its chronicity and recurrence, more effort should be devoted toward preventing the attacks. The attitude that patients "outgrow their asthma" or that it will subside spontaneously is not justified and is not in keeping with sound medical practice. The sooner asthma is accepted as a serious, disabling disease and is put in the category with pernicious anemia and diabetes, the better the condition will be controlled.

## *Types of Asthma*

Two general types of asthma are encountered. In one there are recurrent paroxysms of cough, wheezing, and dyspnea—the typical asthmatic attack. These attacks usually come on suddenly and, when treated successfully, subside; the patient remains asymptomatic between the paroxysms. The other type of asthma is seen in those patients who may not have enough respiratory distress to require emergency relief but who stay "wheezy" and short of breath day in and day out. These patients often develop complications of emphysema, bronchitis, bronchiectasis, and pulmonary fibrosis sooner than those with irregular but more severe paroxysms.

There is a general attitude among the laity that nothing can be done for asthma. This attitude accounts for the fact that, all too often, patients with asthma do not seek medical advice for many years. When they are first seen, emphysema, diminished vital capacity, and chest deformity are already established. Treatment at this stage can only arrest the process at best, and the patient is left with a permanent pulmonary insufficiency.

It is true that some cases of asthma seem to defy all therapeutic efforts, but such cases are certainly in the minority. Statistics are notoriously unreliable in allergic diseases, because the course is unpredictable and there is no objective method to determine the efficacy of treatment(1). As more patients are studied thoroughly and given a systematic course of treatment, the failures will become fewer.

Every asthmatic patient is entitled to a thorough medical and allergic work-up. Protein sensitization tests, when correlated with the history, are invaluable in establishing the causative factors. Once the etiology is established, the therapeutic program can be outlined. Patients with asthma are usually cooperative in carrying out a plan of treatment, if the logic of such a plan is explained to them. From the patient's standpoint there is nothing more discouraging, after being subjected to a detailed history and physical examination and numerous skin tests, than to be dismissed with a casual statement that "nothing much was found," or to be given a long list of foods to avoid, or advised to stay clear of dust. The majority of such patients have already discovered that dust

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1. Levine, Philip and Coca, A. F.: Studies in Hypersensitiveness. XXII. On the Nature of the Alleviating Effect of the Specific Treatment of Atopic Conditions, J. Immunol. 11:449-461 (June) 1926.

causes trouble and have taken measures to control it. *There is no practical way to avoid entirely the inhalant allergens which are largely responsible for asthma.* The logical treatment is (1) to avoid exposure to the offending substances as much as possible, and (2) to lessen the sensitivity which has been acquired.

### *Desensitization*

Asthma is basically a disease of hypersensitivity; therefore, efforts should be directed toward decreasing this sensitivity. Rarely is an allergic individual found to be sensitive to only one or two substances. As a rule, there are multiple sensitivities(2) to environmental factors which cannot be avoided unless the patient is forced into a very abnormal existence.

Desensitization is the process by which an antigen is repeatedly introduced in increasing amounts until fairly large doses can be tolerated without producing allergic symptoms. The mechanism of desensitization differs from that of immunization. In the latter, the antigen is given to stimulate the production of antibodies to protect the body against a biologic invasion; in the former, the antigen is given in very small amounts to neutralize existing antibodies.

Various routines are used for the desensitization of an allergic individual. Perennial, pre-seasonal, and co-seasonal methods all have their advocates. Specific desensitization is preferred when the etiologic agent is known.

### *Determination of the patient's sensitivities*

A thorough medical and allergic investigation is essential to determine the agent or agents involved. Skin-testing gives much information in a short period of time, but should always be correlated with the history. Positive reactions to fall pollens mean little when the asthma occurs in the winter or spring.

Advantages of the intradermal method of skin-testing are that the results are quite uniform and that a large number of tests can be given in a short time. Serious reactions are very rare. Among thousands of patients tested in the Duke Clinic, each receiving from 100 to 150 separate tests at a sitting, no serious reactions have been encountered. However, serious and even fatal reactions to skin tests have been reported, and adrenalin should always be available for immediate use. The reactions are read in fifteen to twenty minutes.

When the history is suggestive of bacterial sensitization, a bacterial vaccine is prepared from the sputum or nasopharyngeal secretion. Skin tests to the individual organisms grown on culture may reveal positive reactions to one or several among the group.

### *General principles of desensitization*

Practically all standard textbooks on allergy recommend desensitization in the allergic diseases, but to outline a workable plan for every case is difficult. In asthma there are usually multiple allergens, and the results of treatment are not uniform. The number of allergens to include in the mixture, the strength of the initial dilution, the method of administration (hypodermic, intravenous, oral), the frequency of injection, the rapidity of increase, and the length of time treatment should be continued are problems which must be decided in each individual case. There are four essential rules to follow in any program of desensitization:

1. *Prepare a solution containing the major reacting allergens.* There is no reason why extracts of pollens, dust, danders, molds, a few foods, and a bacterial vaccine cannot be made into one solution. This method simplifies the program a great deal.

2. *Begin with a solution that will not cause local or systemic reactions.* In general, the pollens, dust, danders, and certain of the foods are potent allergens and have to be used in more dilute solution than the molds and bacterial vaccine. For diagnostic intradermal testing this clinic uses the pollens, dust, and epidermals in a 1:1,000 dilution, foods and molds in a 1:100 dilution, and bacteria in a 1:10 dilution and undiluted (24-hour growth from agar slants washed into 30 cc. of saline). There are some exceptions where the dilution has to be adjusted to prevent false-positive reactions.

3. *Progressively increase the dose until a fairly concentrated solution is being given without reaction.* As the amount of allergens is thus increased, a tolerance is acquired, and clinical improvement usually parallels this acquired tolerance.

4. *Maintain the patient's tolerance by continuing the injections at regular intervals.* Usually a course of treatment lasts six to

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2. Cooke, R. A. and Vander Veer, Albert, Jr.: Human Sensitization, J. Immunol. 1:201-305 (June) 1916.

twelve months, and the patient is then re-evaluated and re-tested to see if any sensitivities have been lost or any new ones acquired. If symptoms persist and new sensitivities are discovered, subsequent courses of treatment are given.

### *Method of desensitization*

Serial dilutions of the reacting allergens are prepared in vials of saline, provided with rubber stoppers to prevent contamination. Injections are given subcutaneously with a tuberculin syringe, which facilitates the measurement of small doses. *The treatment should be carried out in a systematic and uninterrupted manner under the supervision of a physician.* Our routine is to begin with an initial dose of 0.1 cc. of the weakest dilution and to increase the dose by 0.1 cc. at each subsequent injection — either every other day or twice weekly. When the dose of 0.9 cc. has been reached, the next strongest dilution of the mixture is used. Each dilution is administered in the manner described above. This schedule is continued until the dose of 0.9 cc. has been reached in a fairly concentrated solution with the allergens in a 1:25 dilution, fungi 1:10 and the autogenous vaccine undiluted. Five tenths cubic centimeter is then given weekly as a maintenance dose.

The following is an outline of a typical desensitization schedule:

| | | |
|---|---|---|
| **First dilution** — | Allergens* | 1:20,000 |
| | Fungi | 1:4,000 |
| | A. V.† | 1:2,000 |
| Date: | | |
| .............................. | 0.1 cc. | |
| .............................. | 0.2 cc. | |
| .............................. | 0.3 cc. | |
| .............................. | 0.4 cc. | |
| .............................. | 0.5 cc. | |
| .............................. | 0.6 cc. | |
| .............................. | 0.7 cc. | |
| .............................. | 0.8 cc. | |
| .............................. | 0.9 cc. | |

| | | |
|---|---|---|
| **Second dilution** — | Allergens | 1:2,000 |
| | Fungi | 1:400 |
| | A. V. | 1:200 |
| Date: | | |
| .............................. | 0.1 cc. | |
| .............................. | 0.2 cc. | |
| .............................. | 0.3 cc. | |
| .............................. | 0.4 cc. | |
| .............................. | 0.5 cc. | |
| .............................. | 0.6 cc. | |
| .............................. | 0.7 cc. | |
| .............................. | 0.8 cc. | |
| .............................. | 0.9 cc. | |

| | | |
|---|---|---|
| **Third dilution** — | Allergens | 1:200 |
| | Fungi | 1:40 |
| | A. V. | 1:20 |
| Date: | | |
| .............................. | 0.1 cc. | |
| .............................. | 0.2 cc. | |
| .............................. | 0.3 cc. | |
| .............................. | 0.4 cc. | |
| .............................. | 0.5 cc. | |
| .............................. | 0.6 cc. | |
| .............................. | 0.7 cc. | |
| .............................. | 0.8 cc. | |
| .............................. | 0.9 cc. | |

| | | |
|---|---|---|
| **Fourth dilution** — | Allergens | 1:25 |
| | Fungi | 1:10 |
| | A. V. | Undiluted |
| Date: | | |
| .............................. | 0.1 cc. | |
| .............................. | 0.2 cc. | |
| .............................. | 0.3 cc. | |
| .............................. | 0.4 cc. | |
| .............................. | 0.5 cc. | |
| .............................. | 0.6 cc. | |
| .............................. | 0.7 cc. | |
| .............................. | 0.8 cc. | |
| .............................. | 0.9 cc. | |

*Pollens, other inhalants, and foods.
†Autogenous vaccine.

Three to four months may be required before a fairly concentrated solution can be given without reactions. After 0.9 cc. of the fourth dilution is reached, the dose is reduced to 0.5 cc., and this amount is given weekly for seven or eight months. The whole course of treatment extends over a period of ten to twelve months. It is helpful in keeping records if the physician will fill in the date when each of the injections is given.

### *Results*

Evaluation of the results of treatment in asthma depends entirely upon clinical observation and the length of time the patient remains improved. The word "cure" does not have a place in the prognosis of asthma. Relapses are frequently seen in patients thought to be "cured," if they are followed long enough. The problem, therefore, is one of controlling a condition which tends to relapse. It would not be over-optimistic to say that two thirds of the patients who complete the outlined desensitization schedule get good results. Best results are obtained when the asthma is largely due to extrinsic factors. Desensitization with the inhalant allergens is uniformly more effective than bacterial desensitization. However, bacterial vaccines(3) have frequently given good results

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3. (a) Walker, I. C.: The Treatment of Bronchial Asthma with Vaccines, Arch. Int. Med. 23:220-234 (Feb.) 1919.
(b) Crump, Jean: Asthma in Children Treated with Autogenous (Bronchoscopic) Vaccine, Am. J. Dis. Child. 58:768-777 (Oct.) 1939.

in cases where there is no active focus of infection.

Causes of poor results or failures in treatment are:

1. *Stopping treatment too early.* If the patient improves rapidly, he is inclined to discontinue treatment. If there is no noticeable improvement for several months, discouragement is inevitable.

2. *Interruption of treatment schedule.* There are many factors which operate here, negligence probably being the most common.

3. *Continuation of contact with allergens.* The tolerance achieved by desensitization is only a relative one. Exposure to large quantities of the offending allergens may exceed the patient's threshold of tolerance. An offending food may be at fault when the symptoms persist in spite of treatment.

4. *Failure to discover all factors responsible for symptoms.* It is impossible to test a patient to every substance which can cause asthma. Common environmental allergens are used, plus additional ones indicated by the history. Skin tests are by no means infallible, and a negative skin test does not rule out any particular substance.

5. *Active foci of infection.* The problem of controlling a bacterial allergy is difficult if there is any active focus of infection in the upper respiratory tract.

6. *Situational reactions.* Asthma may be a convenient disease for some. The disease may be serving a purpose which makes the patient reluctant to part with it.

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# PENICILLIN AEROSOL THERAPY

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The use of penicillin and other antibiotics as aerosols for the treatment of certain pulmonary infections is a logical procedure, simple to perform, and one that frequently gives good results. Some time ago, one of us(1) reported on the topical application of penicillin in infections of the nose, mouth, and throat. At that time we tried to find a simple method whereby patients might actually inhale penicillin. The breathing of penicillin as a spray made by an ordinary atomizer was a failure in our hands, despite a recent article to the contrary(2). The particles of liquid were apparently too large, and, despite numerous attempts, we never felt that in a single case we were able to coat the pulmonary tract with the drug. Many articles(3) during the past ten years have emphasized the importance of the inhalation of bronchial dilators for asthma, and it seemed obvious that in these cases the drug did enter the bronchial tree. That penicillin could be made to enter the bronchial tree and to be absorbed from the lungs into the circulation has been amply proven by Barach(4) and Segal(5).

### *Method of Treatment*

After some experimentation, it was found that a simple apparatus manufactured by the Vaponefrin Company, with the trade name of "Complete Vapocillin Equipment," was quite satisfactory. This equipment essentially consists of a vaporizer which is attached to a nosepiece or a mouthpiece, and a re-breathing bag. In order to vaporize the solution, a gas or air under pressure is required. For the treatment of hospitalized patients, we have most frequently used the ordinary oxygen tank with a reduction or flow valve. With the reduction valve adjusted to about 2 pounds of pressure per square inch, or the flow valve adjusted to deliver from 6 to 18 liters of oxygen per minute, approximately twelve minutes are required to vaporize 1 cc. of antibiotic. Flow valves or the usual oxygen equipment is difficult to obtain, and we have found that a common reduction valve, such as is used in commercial work, does just as well as the more expensive equipment. A simpler source of power is obtained by the use of a small, electric-driven air compressor, like that used for a paint-spray gun. The cheapest and simplest method so far discovered to give the necessary pressure is an ordinary foot-operated automobile tire pump.

One cubic centimeter of penicillin is usually

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1. Menefee E. E., Jr., and Atwell, R. J.: Effect of Topical Penicillin on Infections of the Upper Respiratory Tract, South. M. J. 39:726-728 (Sept.) 1946.

2. Morse, F. W.: Penicillin Spray by Bulb Atomizer in Respiratory Infections, J.A.M.A. 132:272-278 (Oct. 5) 1946.

3. Richards, D. W., Jr., Barach, A. L., and Cromwell, H. A.: Use of Vaporized Bronchodilator Solutions in Asthma and Emphysema, Am. J. M. Sc. 199:225-232 (Feb.) 1940.

4. Barach, A. L. et al.: Inhalation of Penicillin Aerosol in Patients with Bronchial Asthma, Chronic Bronchitis, Bronchiectasis and Lung Abscess, Ann. Int. Med. 22:485-509 (April) 1945.

5. Segal, M. S. and Ryder, C. M.: Penicillin Aerosolization in the Treatment of Serious Respiratory Infections, New England J. Med. 233:747-756 (Dec. 20) 1945.

administered at each treatment. The strength of the solution may be varied, but, in our opinion, it should never contain less than 10,000 units. Perhaps 20,000 or 25,000 units per cubic centimeter is preferable in most cases. We believe that treatment should be given at least four times a day. The dose of streptomycin is much less certain, but probably 250,000 micrograms four times a day is not too great. Since it is well known that many bacteria rapidly develop resistance to streptomycin, it is better to overtreat, despite the present high cost of the drug, than to take a chance on giving too little of this antibiotic.

### *Results of Treatment*

Up to the present time we have treated 87 patients for various pulmonary infections.

#### *Laryngitis*

Six patients with acute catarrhal laryngitis were treated. All had a history of coryza or sore throat preceding the laryngitis, but in most of these the earlier symptoms had disappeared, and at the time of admission they were complaining only of a dry, burning sensation of the throat and marked hoarseness. Physical examination showed little of interest. On indirect laryngoscopic examination, the vocal cords were found to be hyperemic and swollen. All patients were put to bed and told not to talk, and penicillin aerosol was started. Within twelve hours, or after three treatments, there was marked subjective improvement in every case. By the end of forty-eight hours all traces of acute inflammation had disappeared.

#### *Acute tracheobronchitis*

Eleven patients with acute tracheobronchitis in which the predominating bacterial agent was a streptococcus, pneumococcus, or staphylococcus were seen and treated. Seven of these had histories of preceding colds, while in 4 the onset was acute without any previous symptoms. In no case did the temperature exceed 38.5 C. (101.3 F.). Physical examination was negative in all cases except for the usual signs of upper respiratory infection. Careful examination of the lungs revealed some fine rales over the bases, bilaterally; x-rays of the chest were normal, however.

These patients were treated with penicillin aerosol, in the manner described above, and within five days all were apparently cured. Most of them felt much better within one day, with marked diminution of cough and disappearance of the dull, substernal discomfort. Three other patients, who showed primarily Micrococcus catarrhalis in their sputum cultures, did not show definite improvement after three days of penicillin aerosol therapy. Hence this therapy was discontinued and sulfonamides by mouth were substituted, with better results.

#### *Chronic bronchitis*

A total of 14 patients were treated. The average duration of symptoms prior to aerosol therapy was seven months, and every patient had been treated by other methods. Nine patients were cured or greatly improved by aerosol therapy; 3 were temporarily improved, while 2 showed no improvement. Brief summaries of 3 cases will best illustrate the results.

##### *Case 1*

M.T., a 55-year-old white female, was admitted on July 26, 1946, complaining of chronic cough, purulent sputum, and low-grade fever with general malaise. These symptoms were of eight months' duration. She had been treated with autogenous vaccines, sulfonamides, parenteral penicillin, steam inhalation, and various cough syrups without improvement. Physical examination revealed rales at both bases. She raised an average of 30 cc. of purulent sputum per day. Sputum cultures showed Staphylococcus aureus, beta hemolytic Streptococcus, and alpha hemolytic Streptococcus. She was started on penicillin aerosol, 20,000 units four times a day. After two days the cough was much less severe, and after six days of treatment she ceased to raise any sputum. Treatment was continued for a total of twelve days, and the patient was then discharged. She has been frequently seen as an outpatient since, and has had no return of symptoms.

##### *Case 2*

L.H., a 37-year-old white female, was admitted on August 14, 1946. She had had a chronic cough for two years. Physical examination showed numerous rales and rhonchi in the lower half of both lung fields. Bronchograms were done and were entirely normal. No infection in the upper respiratory tract could be found by the otorhinolaryngologist. She was started on penicillin aerosol, 20,000 units four times a day. There was marked improvement in her condition, with disappearance of cough, clearing of the physical signs, and reduction in the amount of sputum. After ten days of therapy, she was discharged as improved. Within three weeks, however, she had a return of symptoms and has had to be treated repeatedly at home. Hence she is classified as only temporarily improved.

##### *Case 3*

E.M., a 30-year-old white male, was admitted on August 18, with a diagnosis of chronic bronchitis of eleven months' duration. Physical examination showed little of interest except for rales at both bases. X-rays of the chest were entirely normal. He was treated with 25,000 units of penicillin aerosol, administered four times a day for fourteen days.

At no time did he show any definite improvement. He is therefore classified as unimproved.

*Bronchiectasis*

Once dilatation and deformity of bronchioles have taken place, it is obvious that no medical therapy can ever correct the pathologic process. Surgical removal of all diseased portions of the lung is the only possible cure. On the other hand, there are many patients with bronchiectasis who for various reasons are not suitable candidates for surgery, or who absolutely refuse operation. In such cases penicillin aerosol has proven to be of value in the control of bronchiectasis. Ten patients who were not suitable candidates for resection were treated with penicillin aerosol. Six were definitely improved, while 4 did not show any reduction of symptoms.

The 4 patients failing to show improvement ranged in age from 36 to 64, and the duration of symptoms varied from three to fifteen years. Three had bilateral involvement; 1 had extensive unilateral bronchiectasis. In 3, the sputum contained the usual flora that would be expected: staphylococci, streptococci, and fusospirochetal organisms. These 3 patients were treated with 20,000 units of penicillin four times a day for a minimum of twelve days. At the end of that time there had been no diminution of cough, the sputum was not decreased, and the same organisms were still present on sputum culture. It is possible that the dosage of penicillin was entirely too small, the frequency of treatment insufficient, and the duration of treatment too short. The fourth patient showed numerous colonies of Friedlander's bacillus on sputum culture, in addition to Staphylococcus aureus hemolyticus. When he failed to improve on penicillin aerosol, he was tried on streptomycin aerosol, receiving 0.25 Gm. four times a day for five days. This also failed to produce any noticeable improvement.

The 6 patients who showed definite improvement on penicillin aerosol varied in age from 20 to 66 years. Their symptoms had been present for a minimum of one year and a maximum of thirty years. The sputum of these patients varied in amount from 30 cc. to 150 cc. a day, and contained the usual flora. These patients received 20,000 units to 25,000 units of aerosol penicillin four times a day for ten to twenty days. At the end of the course of treatment, 5 of the 6 had no sputum at all, while in 1 case the sputum had decreased from 80 to 20 cc. per day. They all felt better, had little or no cough, and were gaining weight. After discharge from the hospital they have continued to be improved, although with upper respiratory infections they temporarily become worse. Several have their own equipment and continue to treat themselves at home for an average of seven days out of each month. Two return to the hospital from time to time for further treatment.

Seven patients with bronchiectasis who were suitable candidates for operation were treated from three to ten days prior to surgery. In each case the sputum was decreased in amount and became less purulent in character. They all stood the operative procedures well, and are symptom-free at present. It is the opinion of the thoracic surgeons that preoperative therapy is of distinct benefit. In one patient, a 23-year-old male who had had bronchiectasis for at least fifteen years, it was decided to remove the left lower lobe, which showed extensive bronchiectatic changes by bronchogram. Minimal changes were also present in the right lower lobe. Following operation he continued to bring up some purulent sputum. Penicillin aerosol therapy was then begun, and all symptoms and sputum disappeared. By the judicious use of aerosol from time to time, he has remained symptom-free and has been able to return to work.

*Pneumonia*

Seven patients with bronchopneumonia have been treated with penicillin aerosol alone. These ranged in age from 17 to 42 years. None were extremely ill on admission to the hospital, but the diagnosis was confirmed by x-ray in all cases. Sputum cultures showed the common organisms: pneumococci, staphylococci, and streptococci. All showed rapid subjective improvement, were afebrile within forty-eight hours after therapy was started, and were discharged from the hospital in less than a week. We have not treated any cases of pneumococcal lobar pneumonia by penicillin aerosol. Although Segal(5) has shown that this disease can be successfully treated by penicillin aerosol, we feel, as he does, that it is simpler and more efficacious to treat pneumococcal lobar pneumonia by the sulfonamides or by parenteral penicillin. Two patients with atypical pneumonia, probably virus, were treated with penicillin aerosol. As would be expected, there was no evidence of improvement in either case.

*Lung abscess*

Seven patients with lung abscess were treated with penicillin aerosol. In 4 patients, none of whom had had the process more than ten weeks, there was rather prompt diminution of the sputum and the temperature became normal after three to six days. Serial x-rays showed the surrounding pneumonic process to clear within ten days, and by the end of the third week no cavity was visible. The patients were discharged from the hospital on modified bedrest, a high-calorie diet, accessory vitamins, and sulfonamides to be taken at home. They have been followed in the outpatient clinic for periods of three months to one year, and so far all have remained well.

One patient with multiple cavities in the right upper lobe, who had been sick for four months, was treated for seven days with 25,000 units of aerosol four times a day. At the end of this time he had shown no improvement, and was actually worse. Aerosol was continued, and parenteral penicillin given also. He still failed to improve and, after a second week, was transferred to surgery. The right upper lobe was removed, and the patient then made an uneventful recovery.

Two other patients with lung abscesses were also treated with penicillin aerosol. They showed subjective improvement, and x-rays showed clearing of the surrounding pneumonia. At the end of nineteen days of treatment, however, the cavities were still present. They were transferred to the surgical service, where open drainage was instituted in one case, and lobectomy was performed in the other. Both patients are now apparently well.

*Intrinsic asthma*

Nine patients with intrinsic asthma were treated with penicillin aerosol. Their ages varied from 21 to 64 years. The usual history revealed no seasonal incidence in the asthma, but showed that it always occurred following upper respiratory infections. On admission they were all having acute asthmatic attacks which started off with coryza, followed by a cough with purulent sputum, and then by bronchial spasm. Seven patients were markedly improved after four to nine days of aerosol therapy. In one of these, benadryl was given in addition to the aerosol, and another received aminophyllin suppositories. Five patients, however, received penicillin aerosol alone. In all patients who showed improvement, sputum cultures and autogenous vaccines were made, and at the time of discharge from the hospital they were started on the usual desensitization program, to be carried out for the long-range therapy.

Two patients did not improve. One was a 55-year-old white male whose asthmatic attack had been going on for sixteen days prior to admission. He received 20,000 units four times a day for ten days, and at the end of this time he still had all of his symptoms. The other, a 48-year-old female, seemed slightly worse after five days of therapy, and penicillin was discontinued.

*Friedlander's bacillus infection*

Four cases of Friedlander's bacillus infection were treated with aerosol, with varying results.

*Case 1*

E.M., a 29-year-old white female, was admitted to Duke Hospital complaining of cough and fever of ten days' duration. X-rays of the chest showed a patchy, confluent bronchopneumonic process in the right lower lobe. Sputum cultures showed large numbers of Friedlander's bacilli. The patient was started on streptomycin aerosol, 0.25 Gm. in 1 cc. of normal saline, receiving this dose four times a day. After four days, her temperature was normal, and by the sixth day, x-rays showed the process to be clearing rapidly. The patient has remained well.

*Case 2*

A.M., a 50-year-old male, was admitted complaining of asthma of seven days' duration. X-rays revealed a pneumonic process in the right upper lobe. Sputum cultures showed Friedlander's bacilli to be the predominating organism. He was given 0.15 Gm. of streptomycin aerosol four times a day for seven days. After the third day the bronchial spasm was relieved, and at the end of the seventh day x-rays of the lungs were clear.

*Case 3*

A.P., a 47-year-old female, was admitted complaining of chronic, recurrent cough, purulent sputum, and frequent hemoptysis of fifteen years' duration. Bronchograms showed bilateral bronchiectasis. The sputum was cultured, and a pure growth of Friedlander's bacillus resulted. She was treated with 25,000 units of penicillin aerosol four times a day for nine days without improvement. She then received 0.25 Gm. of streptomycin eight times a day for three days. At the end of this period, neither the cough nor the sputum had improved. For the next fourteen days she received 1 cc. of aerosol containing 0.33 Gm. of streptomycin and 40,000 units of penicillin four times a day. There was still no change, and the patient was discharged unimproved.

*Case 4*

B.D., a 50-year-old male, was admitted with recurrent, intrinsic asthma. X-rays showed the lungs clear. Sputum cultures grew Friedlander's bacilli, alpha Streptococci, Neisseria sicca, and an anaerobic mixture. No streptomycin was available, and he was treated with penicillin aerosol, 20,000 units four times a day for ten days. At the end of that time there had been no subjective improvement, and repeated sputum cultures constantly showed the same organisms.

### *Miscellaneous conditions*

Seven patients with miscellaneous infections or diseases of the respiratory tract were treated, with indifferent results. One patient with lipoid pneumonia received penicillin aerosol, 20,000 units four times a day for seven days, without any improvement. One patient with interstitial fibrosis of the lung of unknown etiology received aerosol penicillin, 25,000 units four times a day for ten days. At the end of that time his cough, sputum, and shortness of breath were no better. One patient with tuberculosis of the trachea received 30,000 units of penicillin aerosol for sixteen days, with no improvement. Unfortunately, because of the excessive cost, streptomycin could not be tried. Successful treatment of a somewhat similar case with streptomycin has been reported(6). Three patients with monilia infection of the lung received aerosol therapy for an average of ten days each. X-ray showed no real change at the end of this time, although 2 patients felt better and had less sputum. One patient with bullous emphysema and superimposed bronchitis was treated for ten days with penicillin aerosol. At the end of this time his cough was much reduced, his sputum had completely disappeared, and his shortness of breath was markedly relieved. X-rays showed no change, however, and it is obvious that the improvement was due entirely to the clearing of the bronchitis. As would be expected, the emphysema was not affected.

### *Summary*

Eighty-seven patients with various infections of the respiratory tract have been treated with penicillin or streptomycin aerosol. In the acute bacterial infections, such as laryngitis and acute tracheobronchitis, penicillin aerosol seems to reduce the length and severity of the disease. In many cases of chronic bronchitis of long duration, aerosol therapy gives temporary or permanent improvement. Cases of bronchiectasis, not suitable for surgery, can frequently be controlled by the use of penicillin aerosol, although it is obvious that there is no permanent improvement and that such patients need rather frequent courses of treatment. Acute lung abscesses are apparently helped by aerosol therapy, although in the more chronic cases the results are disappointing. Intrinsic asthma seems to be helped in a large percentage of cases, but this method of treatment should not be substituted for desensitization therapy.

Streptomycin used as an aerosol gives definite promise of being of great benefit in certain of the gram-negative bacterial infections of the respiratory tract. Virus diseases, fungus diseases, and diseases due to chemical agents or of unknown etiology are not affected by penicillin or streptomycin aerosol.

### *Conclusion*

The antibiotics given in the form of aerosol offer a simple therapeutic approach to many of the common diseases of the respiratory tract. The equipment necessary to carry out such treatment is not too expensive, and it can be easily used at home. Further study of this approach, particularly with the use of the newer antibiotics, should be carried out.

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# NEW HORIZONS IN DRUG THERAPY

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DURHAM

The ultimate aim of most medical practice is the treatment of disease or the correction of abnormal states in the body. Much of this treatment is accomplished by the administration of chemicals, which we choose to call drugs. For centuries most of these drugs were crude mixtures, usually given empirically with the most fanciful theories as to their mode of action, and often with severely depleting effects upon the patient. However, since the establishment of the modern science of pharmacology and the application of laboratory methods to the study of drugs, progress in medical treatment has been relatively rapid.

It is beyond the scope of this paper to review all of the numerous recent advances in drug therapy, but attention will be directed to some of those which have particular sig-

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nificance for the future. Among the most spectacular achievements of modern science have been the new antibacterial drugs. With the development of these compounds it has become increasingly apparent that drugs may act upon bacteria in ways which are basically similar to the mode of action of therapeutic agents in man. This basic similarity is in the regulation of physiologic processes in the organism, whether microbe or man. In dealing with disease-producing micro-organisms it is our purpose so to influence these processes that growth of the invaders becomes impossible.

### *"Competitive Inhibition"*

It has been learned, at least in part, how this purpose is accomplished by sulfanilamide, and at the same time information of great value in understanding drug actions and in pointing the way to new developments has been obtained. It was discovered quite early that extracts of tissues, yeast, and bacteria could inhibit the antibacterial action of sulfanilamide. Further study revealed that this inhibitory effect was due to the presence of para-aminobenzoic acid (one of the constituents of the vitamin B complex), and that the effect could be produced in the test tube or in animals by the synthetic chemical. It then was found that para-aminobenzoic acid (PABA) is necessary for the growth of many bacteria—an "essential metabolite." Sulfanilamide and PABA are closely related in structure, and it is believed that sulfanilamide prevents the growth of bacteria by taking the place of PABA in the chemical reaction in which it normally is concerned in the growth of organisms. In this way the utilization of the essential metabolite is prevented by sulfanilamide (a "competitive inhibitor"), so that metabolism and growth are halted(1).*

The situation is quite complex(2), and only a beginning has been made in the study of the principle of metabolite antagonism or competitive inhibition. However, compounds have been produced which interfere with the utilization of chemically related essential metabolites by micro-organisms and animals. A striking example is furnished by dicoumarol and vitamin K. These substances possess chemical similarities, and in all probability dicoumarol decreases the prothrombin of the blood (and hence its coagulability) by competing with vitamin K in its essential role in the synthesis of prothrombin. Also it now appears quite likely that the occurrence of nicotinic acid deficiency in animals on a corn diet (and perhaps of pellagra in man) is due to the presence of a "competitive inhibitor" of nicotinic acid in corn(3). Further understanding of the principle of competitive inhibition almost certainly will open new horizons in the development of drugs. For instance, little is known concerning the mode of action of the antibiotics, but it is not unlikely that some phenomenon such as that described above is concerned in their antibacterial effects. Progress has been made in the difficult chemistry of these compounds by the synthesis of penicillin(4), and we may anticipate that further knowledge will lead to better remedies, as well as to other fundamental advances in chemotherapy.

It should be pointed out that some of our older drugs exert their effects by competing for active receptors on cells or in enzyme systems, thus preventing the attachment of the usual chemical mediator or metabolite. Such drugs as curare and atropine, which block certain body functions, probably act in this way. In other instances drugs stimulate to action certain structures, such as muscle or gland cells, by attaching themselves to the receptors of those cells, thus simulating the effect of the normal chemical mediator. Space does not permit further development of this subject, but it is of the greatest importance in understanding and anticipating the action of drugs.

It can be seen from the above discussion that "chemotherapy" and "drug therapy" are merging in the fundamental concepts of the action of chemical substances on cells and vital processes. As these concepts are more clearly elucidated, they serve as guide posts for the discovery and synthesis of new drugs which constantly extend our horizon, not

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[*] Space does not permit the mention of all important publications pertaining to the subjects discussed in this paper. Therefore references cited are not necessarily the earliest papers, but often are later articles which furnish a more complete bibliography. Apology is made for omissions which have occurred in this way.

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only in therapy, but also at times in the understanding of disease.

### *Chemotherapy of Infections*

The chemotherapy of infections had its beginning with the arsenicals of Ehrlich, but the advances made in the comparatively few years since the discovery of sulfanilamide have been spectacular, to say the least. With the synthesis of newer sulfonamides and the discovery of penicillin, the field of protection has gradually broadened, and now includes two of man's traditional enemies—cholera and plague—to say nothing of the spirochetal diseases. Furthermore, streptomycin now promises to bring under control many virulent infections due to gram-negative bacilli, such as tularemia; and the trial of streptomycin and the sulfones in tuberculosis and leprosy may be regarded as preliminary to a concerted attack upon those diseases. Much also has been accomplished in the field of chemotherapy of protozoan infections, such as malaria and tropical diseases(5), by the synthesis of new compounds.

However, as potent as the above chemotherapeutic agents are against certain organisms, they are ineffective in most of the diseases due to fungi, rickettsiae, and viruses. There is promise from experimental work(6) that an antibiotic with fungistatic properties may be developed in the not-too-distant future. Rickettsiae and viruses, unlike bacteria, grow inside cells, instead of extracellularly. Apparently because of this intracellular growth, they have different metabolic processes from bacteria. The most encouraging results in the control of these intracellular organisms have been obtained with the rickettsiae.

Sulfonamides do not inhibit the growth of these organisms in culture(7), and in fact it has been reported that such drugs actually have a harmful effect in experimental typhus(8). The above considerations, together with the knowledge that sulfonamides inhibit the metabolism of para-aminobenzoic acid (PABA) by bacteria, led to the trial of PABA on rickettsiae. The results were striking in that this substance, which is necessary for the growth of many bacteria, has a strong inhibiting effect on the growth of rickettsiae(9). The laboratory studies have been extended and confirmed in clinical medicine by the trial of PABA in typhus, spotted fever, and scrub typhus(10), with beneficial effects. Thus, through studies growing out of sulfonamide research, PABA has assumed a position of great physiologic and therapeutic importance. With such momentous gains behind us, it is not unreasonable to expect that chemotherapy of even the virus diseases eventually will become a reality.

### *Regulation of Body Processes*

#### *Autonomic nervous system*

It has been pointed out above that drugs may be thought of as producing their effects by regulating physiologic processes in the body. The greater the number of these processes we can control by drugs, the more versatile becomes the science of therapeutics. Many of these vital processes are regulated by the autonomic nervous system, and many of our drugs exert their effects by increasing or inhibiting the effects of the sympathetic or parasympathetic division upon the organs innervated. We have potent drugs for increasing the effects of either division, such as mecholyl and prostigmine for the parasympathetic, and adrenalin and ephedrine for the sympathetic division. We also have, in atropine, a fairly satisfactory agent for lessening the activity of the parasympathetic nerves. The greatest deficiency in the field of autonomic drugs, however, has been the lack of a usable compound to inhibit the effects of sympathetic nerves. Interesting and potentially valuable drugs for this purpose now are in the experimental stage—so-called adrenolytic and sympatholytic agents. One of these, priscol, has been found to produce beneficial effects in Raynaud's disease(11). Experiments which we have performed on animals have confirmed earlier reports concerning this drug, and some encouraging preliminary results have been ob-

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tained in patients with vasospastic states(12).

*Cellular growth*

It would be most helpful to be able to control the process of cellular growth in the body when this growth becomes abnormal in malignant neoplastic diseases. Among the great mass of research which is under way in the study of these diseases, not the least important is the searching inquiry into the intimate chemical nature of malignant tissue. If specific chemical affinities can be discovered, it may be possible to design radioactive chemical substances which will carry irradiation directly to the malignant cells, as radioactive iodine has been reported to do in metastatic carcinoma of the thyroid(13). In this instance the specific affinity of thyroid tissue for iodine made possible this approach.

A new group of war gases, the nitrogen mustards, have been found to have significant effects in retarding cellular growth, especially upon lymphoid and similar tissues(14). These effects are exerted chiefly on cells which are in a state of relatively rapid proliferation, thus resembling the effects of x-ray. Results with the clinical use of two of these drugs in certain malignant diseases have given promise of their being of value, especially in Hodgkin's disease and lymphosarcoma(15). Our experience with one of the nitrogen mustards at Duke Hospital(16) has been in accord with the published reports. This new field is largely unexplored, however, because there are many such compounds yet to be subjected to study.

*Central nervous system*

We have little knowledge of how drugs regulate the functions of the central nervous system. One of our greatest needs is for drugs which will relieve pain, but will not produce addiction. We are handicapped by lack of understanding of the action of such drugs as morphine on the central nervous system. Demerol has been of great value, especially because of its spasmolytic properties and because there is less danger of addiction with its use. However, that danger still is present(17), and the physician who doubts this fact is apt to have it demonstrated to him among his own patients. Research on analgesic drugs has been stimulated by the recent discovery of a number of compounds prepared in Germany(18), and it is to be hoped that valuable remedies will be found among these or other synthetic substances. An interesting new concept of the action of chemicals on the higher centers, which can only be mentioned here, is the use of lactic acid in the treatment of certain depressive mental disorders(19).

*Excretion of substances from the body*

Often situations arise in which it is desirable to regulate the excretion of some substance from the body—usually to hasten the excretion of some undesirable substance. This effect often may be accomplished by freeing the material from a combined state in the body, or by regulating the elimination of the compound by the kidney. The use of diuretics to rid the body of excess fluid is an example, as is the increase in excretion of uric acid produced by salicylates and cinchophen.

BAL (British Anti-Lewisite) is a compound of great value which hastens the excretion of poisons such as arsenic and mercury(20). It was developed during the recent war as an antidote for one of the most-feared was gases, Lewisite—an exceedingly toxic arsenic compound. BAL seems to have great affinity for arsenic, and forms a harmless compound with the poison, so that it is excreted, instead of combining with vital cellular enzymes.

Occasionally our purpose is best served by retarding the excretion of a substance—penicillin, for example. One of the chief drawbacks of this drug is the rapidity with which it is lost in the urine. It has been found that, at usual plasma levels, penicillin is excreted largely by "secretion" through

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the renal tubules(21). Simultaneous administration of other substances which are eliminated through the tubules will reduce the rate of excretion of penicillin by overloading the excretory mechanism(22). This method is not practical, however, because such large quantities of the other substances are required. Recently it has been suggested that the transport of penicillin through the tubule cells, from blood to urine, is due to enzyme action, and that it should be possible to block this enzyme system by a "competitive inhibitor." The preliminary report indicates that the loss of penicillin in the urine can be greatly reduced by a chemical which is said to fulfill this hypothesis(23). Much study is necessary, but if this concept can be developed into a workable method it may revolutionize the administration of penicillin.

There are other developments in the control of body processes by drugs which offer new and rapidly expanding opportunities in therapy. Control of the clotting mechanism of the blood, regulation of the production of thyroid hormone, and prevention of the harmful effects of histamine may be mentioned as examples which cannot receive further attention at this time. It also has been demonstrated in recent years that by no means all of the advances in therapeutics depend upon the discovery of new drugs. Both sulfanilamide and penicillin were known for years before their value was realized. There is no estimating the possibilities of compounds now known, which have not received careful study. For instance, curare, which for years was a pharmacologic curiosity, now has assumed great importance in anesthesia and other fields(24).

### *Conclusion*

It is obvious even from this limited survey of advances in therapy, achieved and anticipated, that the physician will find it difficult to keep abreast of the rapid developments and to utilize them wisely, scientifically, and with due regard to the safety of his patients. This responsibility is a staggering one, and to cope with it the physician must be properly prepared by his training in medical school and in the teaching hospital. He must be made to realize early in his career that if he is to keep up with medical progress he must have basic training in the fundamental medical sciences which will enable him to *understand* and *evaluate* new developments as they occur.

In the broad sense, physiology is the basic science of medicine; and pharmacology, which deals with the regulation of physiologic processes in man or in his microbe enemies by drugs, is the foundation of medical therapeutics. The practicing physician cannot be expected to be an expert in these fields, but he must be taught, and frequently reminded, of the habits of thought which will enable him to analyze the problems confronting him in the light of the underlying pathologic physiology of disease and the application of the pharmacologic action of drugs to those problems. This type of thinking must be applied not only to the effectiveness of drugs, but also to their dangers. For instance, the failure of some physicians to understand the simple facts that sulfonamides, when taken into the body, must be excreted largely through the kidneys and that they are liable to precipitate in the urine if precautions are not taken, resulted in many serious renal complications from the use of these drugs.

Only by utilizing and cultivating this approach will the physician (and his patients) reap the greatest benefits (and the fewest dangers) from the rapid strides in medical treatment. As Soma Weiss, one of the great teachers and investigators of modern medicine once wrote, ". . . in . . . therapeutic problems, 'skill' and 'art' are but the summation of rational clinical analysis (diagnosis) and synthesis (treatment)."

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## Maternal Welfare Section*

## INDUCTION OF PREMATURE LABOR

Robert A. Ross, M.D., F.A.C.S.
Durham

During the course of a pregnancy it may become necessary, in the interest of the mother or the fetus, to consider termination of the pregnancy. If this procedure is adopted, it should be clearly understood that the doctor is directing the course of events and has estimated and justified his position. It should also be recognized that the labor is apt to be different from a normal spontaneous labor, the correct term being "induction of premature labor." Induction of premature labor should not be carried out as a matter of convenience; it must have a basis of factual necessity. Once elected, it may progressively build into a major "obstetric headache" by consecutively calling for more and more interference.

### *Methods of Induction*

There are two methods of induction of labor—medical and surgical. Naturally, everything being equal, the simpler and less dangerous should be elected. This is the *medical* method. Once the necessity for the induction is proven, the indications met, and the contraindications ruled out, the following procedure is followed: The patient is hospitalized and allowed breakfast. She is then given a tablespoonful of castor oil and, an hour later, a simple warm enema. While the enema is retained, 2 minims of pitocin is given hypodermically (the patient naturally being on a bedpan). If uterine contractions supervene, no more injections are given. If no pains develop, the pitocin (minims 2) is repeated every half hour until labor begins, or for not more than eight doses. Mathieu and Homan have employed this method in a large series, and reported good results, provided the course is rigidly supervised. If the induction fails, the patient is allowed twenty-four to forty-eight hours' rest, and the procedure is then repeated. The incidence of failure with this method is about 10 per cent.

Investigators in Detroit have shown that the blood level of "pituitrin" varies in different individuals. The trend is toward an increase in the latter weeks of pregnancy. On the basis of this finding they advise increasing the dosage of pitocin by 1 minim at each successive attempt to induce labor, stopping at 8 or 10 minims. Hospitalization is essential because of the necessity of close and constant observation. If tetanic contractions, "painful pain," or evidence of placental separation or fetal distress is noted, immediate sedation and anesthesia are needed.

Some obstetricians prefer the use of castor oil alone, but we have not found this method uniformly effective. Quinine was once extensively used to increase uterine contractions, but the bulk of evidence shows conclusively that there is danger of producing congenital deafness and other distressing sensitivity phenomena in both the mother and child.

If the second medical attempt results in failure and immediate induction of labor is necessary, one should consider *surgical or mechanical* methods. Again one should select the simplest method—in this instance, the rupture of the membranes. The preliminary procedure, as outlined by Hillis, is manually to force the head into the pelvis, to check the fetal heart, and then to determine by rectal examination that the head will "fit" into the pelvis. Anesthesia is not required. An aqueous antiseptic is used, since the patient is not asleep. Strict aseptic technique should be observed. The vaginal tract should not be invaded more than once by the examining fingers. The simple expedient of "stripping" the membranes from the cervix while evaluating the consistency and degree of dilatation of the cervix further insures success of the procedure, at the same allowing "forewater" to form. The rupturing instrument is carried along the examining fingers, and the membranes are encountered and ruptured. After rupture the area is palpated to determine if the cord or an extremity has prolapsed. It is our opinion that the latent period varies inversely with the amount of fluid evacuated, but we do not advocate displacing the presenting part in order to facilitate evacuation of the fluid. A quantity of the antiseptic is poured into the

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vagina, and the fetal heart immediately checked.

Labor usually results within one to twelve hours following such a procedure. We have discarded bougies, catheters, and packs as unnecessary. We rarely use a conical bag. It fails to produce effacement while effecting dilatation, and often, in an effort to save the fetus, we have had to resort to immediate version and extraction in instances where prolapse of the cord is associated with removal of the bag. This procedure is much more difficult when the cervix is poorly prepared.

### *Indications for Induction*

*In the interest of the mother*

Certain diseases incidental to pregnancy and previously existing diseases aggravated by pregnancy may occasionally require induction of labor. The most important of these indications are the *late toxemias of pregnancy* and their complications. These have been discussed in preceding articles published by the Maternal Welfare Committee. De Lee insisted that the diagnosis of an acute nephritis made in pregnancy should call for interruption of the pregnancy. The consensus supports this position. We feel that the hazard to the future health of the mother is in direct ratio to the length of time such complications are allowed to exist. Within reason, and with the patient's and husband's consent, we terminate such complicated pregnancies. Of course we hope to carry the pregnancy until the viability of the fetus is assured, but no one can promise a living baby in a toxemic mother. Too often when this hope is pursued and interruption delayed, the fetus dies *in utero,* or an already crippled kidney is seriously damaged. When the mother has nephritis, it is necessary that the family be acquainted with the possible outcome and be allowed to share the responsibility of a continued pregnancy. In this complication the obstetrician's hand may be forced by the appearance of painful vaginal bleeding, since approximately 50 per cent of the cases of ablatio placentae occur in toxemic patients. Under such conditions termination of pregnancy is urgent.

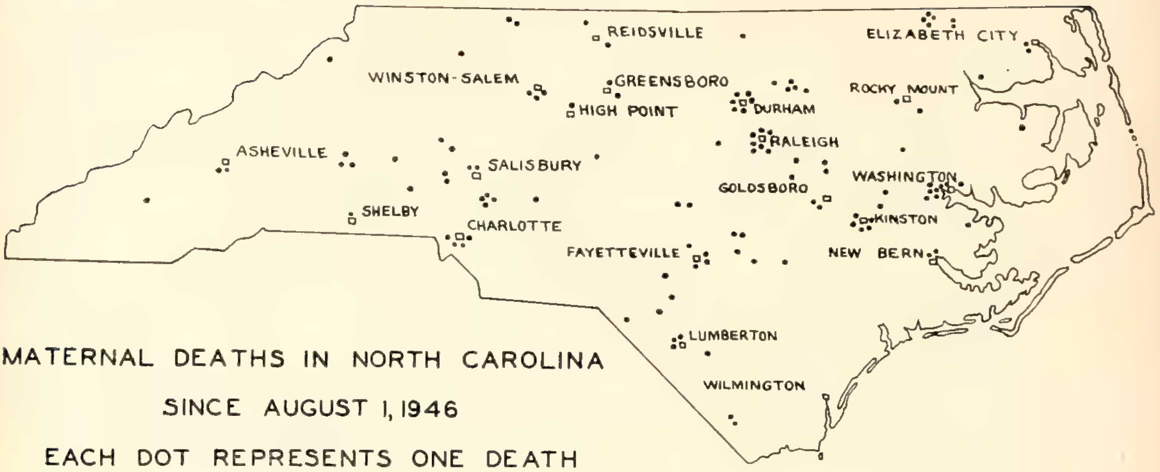
In patients with *eclampsia* it is necessary first to get the eclamptic state under control. The intake and output of fluids should be approximately equal, the circulation should be stabilized, the nervous system rested by sedation, and sources of infection corrected before labor is induced. Toxemic patients are more liable to shock and infection; therefore repeated attempts at medical induction should be made before rupture of the membranes is done. We believe that these patients go into labor more easily than normal patients, but we are apprehensive of a latent period after mechanical interference.

Accidental hemorrhage (premature separation or abruptio placentae) in the last trimester has been mentioned, but painless bleeding from varying degrees of *placenta praevia* is more frequent and really more compelling, since the chance of fetal salvage is greater. The diagnosis may be made by the history, external findings, and "soft tissue" x-ray. If this evidence is not conclusive, the patient should be examined vaginally by the aseptic technique. It is wise to have everything ready to institute immediate measures for terminating pregnancy if the examination precipitates troublesome bleeding. One may rupture the membranes, use Willett's clamp on the presenting part, insert a Voorhees bag, use pitocin, or even deliver the patient by version or hysterotomy if the cervix permits. This problem is more properly discussed in next month's article on "Hemorrhage in the Last Trimester."

There is some valid controversy as to whether labor should be induced in women with *constitutional diseases,* just as there is over the question of performing elective cesarean operations in such patients. In the past the diseases most frequently under consideration were pulmonary tuberculosis, diabetes, heart disease, thyrotoxicosis, and debilitating diseases. These conditions shall be considered in order.

In the proper handling of the tuberculous patient one must lean heavily on the internist's opinion. The consensus is that interruption of pregnancy and induction of premature labor are rarely indicated. If proper care and caution are exercised during pregnancy, the mother's life is not shortened nor the infant's safety jeopardized.

The Joslin group in Boston advocate cesarean section in the diabetic patient. It is a moot point whether such patients are apt to become toxic and whether the infant may be oversized or may perish *in utero* or soon after delivery. Some believe that labor should be induced. Our experience is against rou-



MATERNAL DEATHS IN NORTH CAROLINA
SINCE AUGUST 1, 1946
EACH DOT REPRESENTS ONE DEATH

tine induction of labor or routine hysterotomy. If the labor is closely supervised and medical consultation obtained, the mother and child should survive.

If a patient with heart disease is allowed to become pregnant, she can in all probability be carried to term and normal delivery effectuated. The one notable exception is the patient who has cardiac decompensation during pregnancy. If compensation is restored, I would be inclined to induce labor during a favorable period, rather than take chances on a second breakdown. In some instances it may be difficult to decide between induction of labor and the alternate method of delivery, hysterotomy.

All of us have seen patients who do not tolerate pregnancy and who have some inherent or acquired quality which appears to make their condition more critical as pregnancy progresses. Such a patient may have to have her pregnancy terminated by induction of labor. The woman who has had large babies with resulting birth injuries, and the woman who has previously had difficult and prolonged spontaneous labor may benefit by induction, especially if they have had a repair operation that has given relief.

*In the interest of the fetus*

The welfare of the fetus naturally shares consideration with that of the mother. The object of any pregnancy is to produce a normal, living infant and a physiologically and psychologically adjusted and competent mother. Quite often the attainment of the latter objective depends on the former. It is a recognized fact that a mother who has a normal, healthy baby is more apt to have a normal postpartum course. One must remember that infants delivered after induction of premature labor are apt to be immature or premature, and the necessary preparations must be made for the reception and care of such infants. Such preparation is especially necessary for children delivered of toxic mothers, who perhaps constitute the largest group of women requiring this procedure.

In the mother who has had repeated stillbirths or death of the fetus *in utero* in the latter months of pregnancy labor may be induced prematurely in the hope of delivering a healthy fetus. The procedure may be carried out for the same reasons in the mother who has had an unusually large baby.

With increasing knowledge of the Rh factor and erythroblastosis fetalis, one should be alert for the possibility of incompatability. Where there is an increase in the mother's titer of anti-Rh agglutinins, especially in the latter months of pregnancy when the child is viable, one may consider the possibility of inducing labor in the interest of the fetus.

Under most circumstances one must remember that there is a choice of methods, and that the welfare of both mother and child should be considered in the selection of the procedure to be followed.

### *Contraindications to Induction*

Experience suggests that some of the pitfalls and contraindications to induction of labor should be mentioned. Do not surgically induce labor in patients with monsters, hydrocephalic, or acephalic infants. Spontaneous labor with proper operations, sometimes destructive, when the cervix is fully dilated is more satisfactory in an otherwise thoroughly unsatisfactory circumstance. Death of the fetus *in utero* is not an indication for induction of labor. Distressing results—infection occurring during the latent period, and crippling of the mother—often occur when pressure by the patient, the family, and neighbors force the harassed doctor to induce labor. Such patients will ultimately go into spontaneous labor, which will be attended by fewer complications.

### *Summary*

In summary, the patient should be carefully examined, her history studied, and any contraindication evaluated. Then, when one is satisfied that the indications warrant it, labor should be induced by one of the methods described.

## THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*
DURHAM

### OBSTETRICS AND GYNECOLOGY IN AMERICA

### III

### JOHN STEARNS, 1770-1848

"St. Anthony's fire" was one of several names applied in the middle ages to a terrible disease which appeared among the poor of Europe. It came in two forms: the gangrenous, in which the limbs rotted away; and the spasmodic, in which cutaneous itching was followed by numbness and loss of sensation, especially in the extremities, while intermittent spasms weakened the patient and, ultimately involving the respiratory muscles, brought death. Not until the close of the seventeenth century was it discovered that this disease was the result of chronic poisoning caused by the consumption of bread made from blighted rye; the physician of the Duke of Sully demonstrated the presence in spoiled rye of a substance called ergot, subsequently identified as the sclerotium of the fungus Claviceps purpurea. Despite the discovery of its cause, ergotism continued to occur in epidemic form throughout the countries of Europe until the nineteenth century, and sporadic cases are still encountered.

During the same period which saw the identification of ergot as a cause of disease, another phase in its history was beginning—the recognition of its therapeutic uses. The alkaloid ergotine, the active principle in the curved, dark purple grains, is the most powerful known stimulant of the pregnant uterus and has the merit of causing rhythmic contractions. Yet it was long before the value of the drug was recognized by the medical profession. Midwives in Germany and France were using it during the seventeenth and eighteenth centuries; its use in inexperienced hands was apparently attended by fatal errors, for legislation forbidding its employment was passed in several localities. Nevertheless the practice persisted, spreading slowly through Europe and thence to America. In the early nineteenth century "some ignorant Scotch woman, in the county of Washington," New York, was using this powerful agent with such striking results that her work drew the attention of John Stearns, a physician at Waterford in the neighboring county of Saratoga. He took up the clue thus presented, gave long and careful study to the action of ergot, and then, by his publications on the subject, secured professional acceptance of the drug as an obstetric agent.

John Stearns, born in Wilbraham, Massachusetts, in 1770, graduated from Yale College at the age of 19. He then entered upon medical studies under the direction of the distinguished Dr. Erastus Sergeant, of Stockbridge, Massachusetts. In 1792, Stearns went to Philadelphia, where he studied for a year under such prominent teachers as Benjamin Rush, Caspar Wistar, and William Shippen. He then settled in Waterford, New York, and began the practice of his profession.

Stearns's work with ergot began shortly after the turn of the century. On learning of its employment by a Scottish midwife, he procured a supply of the drug from a field of rye and entered upon cautious experiments in its use. These were completely successful, but only after several years of trial did he seek to publish his findings. At length, on January 25, 1807, he wrote a letter on the subject, in response to a request addressed to him by Mr. S. Akerly. This letter, the first step toward the general acceptance of

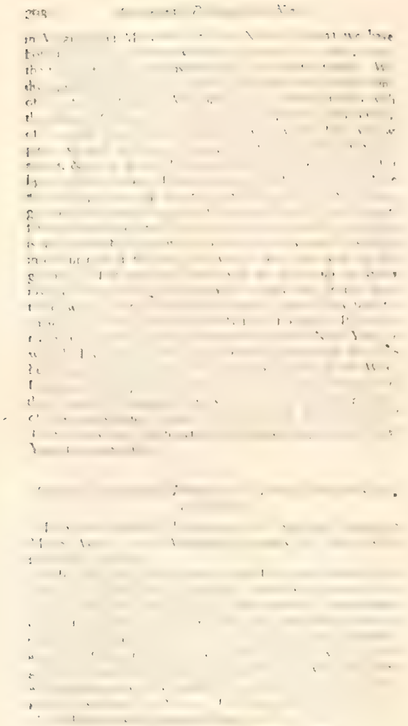


**Fig. 1. The opening page of the first account published by John Stearns on the obstetric use of ergot, as it appeared in the issue of The Medical Repository for November-December, 1807, January, 1808. (From the author's collection)**

ergot as an obstetric agent, was published in the *Medical Repository*, 1807-1808 (see fig. 1). It is a brief and temperate document, giving a concise account of the action of ergot and indicating the dangers involved in the use of the drug:

> "It expedites lingering parturition, and saves to the accoucheur a considerable portion of time, without producing any bad effects on the patient. The cases in which I have generally found this powder to be useful, are when the pains are lingering, have wholly subsided, or are in any way incompetent to exclude the foetus. Previous to its exhibition it is of the utmost consequence to ascertain the presentation, and whether any preternatural obstruction prevents the delivery; as the violent and almost incessant action which it induces in the uterus precludes the possibility of **turning** . . . In most cases you will be surprised with the suddenness of its operation; it is, therefore, necessary to be completely ready before you give the medicine, as the urgency of the pains will allow you but a short time afterwards . . ."(1)

The publication of this letter brought to Stearns numerous queries from physicians throughout the country, to each of whom he at once sent samples of ergot, with directions for its use. In the course of a few years thereafter, misadventures caused by improper use of ergot occasioned the development of a vehement controversy. Eminent physicians disputed about the value of the drug for over a decade; then Stearns himself, in 1822, placed ergot on a firm footing with the publication of an essay which is a classic in the literature of obstetrics, his "Observations on the Secale Cornutum, or Ergot, with directions for its use in Parturition." In this able work he described completely and in detail his method of using ergot in expediting labor, and specifically defined the indications for the administration of the drug. He pointed out the errors commonly committed in prescribing ergot and the dangers of its use in unpracticed hands, then expressed anew his conviction as to the value of the drug.

Stearns's long championship of ergot greatly augmented his professional reputation and brought him many honors, though his abilities were such as would have brought him to the head of his profession even without this fortuitous discovery. Largely responsible, in 1807, for the formation of the Medical Society of the State of New York, he was elected secretary at the first meeting of the organization and retained this office for several years. From 1809 until 1813 he served in the senate of the state of New York, transferring his practice in 1810 to Albany, where he remained for nine years. He then removed to New York City and for the remainder of his life practiced there, prominent as a consultant and industrious in contributing to medical periodicals. He was for four years the president of the Medical Society of the State of New York, and in 1846 became the first president of the New York Academy of Medicine. In 1848, at the age of 78, he received a dissection wound while performing an autopsy; septicemia developed, resulting in his death.

Stearns's contribution to the cause of obstetrics was one of lasting value. For almost twenty years he labored with singleness of purpose and admirable caution to prove and to impress upon his colleagues the worth of a drug which has saved thousands of lives since his day and which is still in use.

—J. C. T.

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1. Stearns, John: Account of the Pulvis Parturiens, a Remedy for quickening Child-birth, in *The Medical Repository*, Second Hexade, 5:308-309, 1807-1808.

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MARCH, 1947

## THE HANES MEMORIAL ISSUE

This month's number represents the first memorial issue of the NORTH CAROLINA MEDICAL JOURNAL ever published. It is fitting that this, the first of three consecutive memorial issues, should be dedicated to Dr. Frederic M. Hanes. He was a member of the editorial board of the JOURNAL from its beginning until his death a year ago, and deserves much credit for its success. No one offered more constructive criticism than he, and no one took more pride in its appearance.

The papers presented in this month's issue have all been contributed by members of the Duke medical faculty, who have been associated with Dr. Hanes as students, as house officers, or as colleagues in the Department of Medicine. Dr. Lamar Callaway deserves especial credit for conceiving the idea of a memorial issue, and for supervising the preparation of the articles. It is hard to think of a tribute that would have pleased Dr. Hanes more than this splendid collection of papers, each written as a labor of love, which make up a sort of literary wreath to his memory.

* * * *

## THE PLIGHT OF OUR PUBLIC SCHOOLS — A WARNING

An editorial in *New York Medicine* for March 5 is especially timely just now, in view of the plight of the public school system—not only in North Carolina, but in the whole nation. The editorial discusses the argument that has been used for many years by the advocates of compulsory health insurance: "that just as education has been socialized—by requiring every child to attend a public school or its equivalent until he reaches the middle teens—so medical care might well be socialized by public employment of doctors through universal taxation."

The editorial continues:

> "Those who argue that the analogy is a sound one must accept the consequences of the analogy. For, if our public education system has its triumphs it also has its failures and its weaknesses. Nearly everyone is aware of the sad plight of the teaching profession as a result of the economic inflation that has taken place in the last year or two. The real wages of school teachers and college instructors, which were never anything to boast about, have in effect been sharply reduced by a soaring cost of living. Moreover, the social position of teachers has been catastrophically depressed in relation to many unskilled occupations through the enormous increases in wages levels that have been forced by trade union action.
>
> "The inevitable result has been that fewer and fewer people are entering the teaching profession, more and more teachers are leaving the profession and the morale of those remaining in the ranks has sunk into the ooze at the bottom of the lake.
>
> "Benjamin Fine, in a series of remarkable articles on conditions in the nation's schools and colleges, appearing recently in the **New York Times,** reports that America's schools today employ 125,000 teachers on emergency or sub-standard licenses. One out of every seven teachers—15% of the total teaching body—cannot meet even the minimum requirements of her state, Mr. Fine revealed, whereas, before the war only 2,300 teachers or one out of every 400 held sub-standard certificates. 'The phenomenal growth in the number of poorly qualified teachers,' says Mr. Fine, 'is the most appalling development in the history of the free public schools.' Eighty thousand of the emergency teachers, he finds, have had less than 2 years of college training and 36,000 have never gone beyond high school. 'As a result of this indiscriminate employment of teachers, the professional standards of the nation have been lowered,' Mr. Fine asserts.
>
> "Mr. Fine quotes a special commission of the National Education Association, which is attempting to raise the professional status of the teachers, as having asked him, 'Would you go out and license 125,000 laymen to practice medicine? Even though we had a shortage of doctors during the war we did not lower the medical standards. Why should we

countenance this in the case of teachers?'

"The picture is disheartening. It should serve both as a warning and a rebuke to any who would urge the dangerous analogy of public medical care as a counterpart of public education. The plight of the teaching profession in our inflating economy would be matched, probably surpassed, by the plight of the medical profession if it were so unfortunate as to be dependent for its economic support upon the public purse. After all, there are nearly a million teachers but only about 150,000 doctors of medicine. Moreover, teachers are at least to some degree unionized and they serve in large groups under local authorities. Teachers can strike against intolerable conditions, and in so doing they often gain considerable public support for their demands. Doctors could not conceivably operate in comparably large units, they have an inherent repugnance for labor union tactics and any strike against the public by doctors of medicine, however well justified, would destroy forever their professional prestige, for a medical strike would directly threaten the very lives of the citizens. If, therefore, the teachers find it difficult to wrest even a modicum of economic justice out of the lethargic public and their timorous political servants, what hope would there be for a politically impotent medical profession in a similar situation?

"It is possible to build up a formidable case for the proposition that our public system of education has, by and large, failed in its primary function—that of producing educated, integrated and balanced adult human beings. But that is another story. The drastic deterioration of the teaching profession, which we are witnessing today—and the alarming lack of concern regarding this situation amongst most people—should be more than ample warning against any who would trot out this lame old analogy once again."

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## DR. H. S. WILLIS HEADS STATE TUBERCULOSIS SANATORIA

On February 27 the Board of Directors of the North Carolina Tuberculosis Sanatoria elected Dr. Henry Stuart Willis as superintendent of the three state institutions, to succeed the late Dr. Paul McCain. Dr. Willis is now medical director and superintendent of the Detroit Municipal Tuberculosis Hospital (the William H. Maybury Sanatorium) at Northville, Michigan, and is well known throughout the nation as a clinician and as an administrator. In coming to North Carolina, Dr. Willis is really coming back home. He was born in High Point and was graduated from the University of North Carolina before getting his medical degree from Johns Hopkins in 1919.

An excerpt from a personal letter written by a member of the house staff of the Maybury Sanatorium offers the best possible recommendation of Dr. Willis. It means all the more because the writer had no idea that any part of the letter would be quoted.

"North Carolina is indeed fortunate to get Dr. Willis to go to head the State Sanatoria. How we do hate to lose him! But it will be a good thing for North Carolina. I was much surprised at his decision to go there; I had not felt that the state could get such a good man to follow Dr. McCain, who was one of his very good friends."

As Dr. Willis assumes his duties on April 15, he may be sure of a warm welcome "back home" from the doctors of North Carolina. They know that the mantle of his friend, Paul McCain, has fallen on worthy shoulders.

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## THE C. M. A. B.

C. M. A. B. is not another alphabetical agency of the government, but is the abbreviation for the Cooperative Medical Advertising Bureau of the American Medical Association. This agency performs a most important function in securing advertisements for most of the state medical journals published in the United States. The fact that medical preparations accepted by this bureau must meet the requirements of the Council on Pharmacy and Chemistry means that they are dependable.

The C.M.A.B. is strictly a non-profit organization, and the efficiency with which it is managed is proved by the fact that the accounts which it handled for its constituent state journals in 1946 amounted to more than $600,000, and that the total expenses of the bureau will be less than 5 per cent of this amount.

The North Carolina Medical Journal has had its full share of this advertising, and to the firms which advertise in the pages of the Journal are due thanks for making its publication possible. Our subscribers can best express their thanks by patronizing these firms, and can help to increase the volume of advertising by saying that they saw the product advertised in the North Carolina Medical Journal.

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## WAXHAW NEEDS A DOCTOR

In this month's issue will be found an advertisement which may be of interest to some young doctor just out of service, who wants to begin work at once as a general practitioner. The town of Waxhaw, in Union County, is without a doctor, and the people who live there and in the surrounding territory are in need of someone to whom they can look for medical care. Mr. Robert Howie writes that the hospital in Monroe, 12 miles distant, would be available to a doctor located in Waxhaw. Anyone interested may communicate with Mr. Howie.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

WILLS: *Oral disposition of personal property is legal under certain circumstances.*

This case revolves about the legality of a nuncupative will—a type of will which is little known and which, although oral, meets the legal requirements for bequeathing personal property and this type of property only.

The records show that a man suffering from the last stages of tuberculosis, and having neither time nor strength to make use of a written will, directed orally that his bank draw a cashier's check for the full amount of his account, payable to his sister at his death. Shortly after making this request the donor died, and the bank, following directions, paid the money to the person named.

The executor of the decedent's estate promptly filed suit in circuit court for the purpose of securing possession of the property covered by the nuncupative will. The lower court rendered judgment in favor of the bank and the sister, who had entered the case as a co-defendant. The executor, in behalf of the estate, appealed to the Supreme Court, alleging failure of delivery of the property as required by law in such cases. The appellate court stated that a gift *enter vivos* must be fully consummated and vests ownership in the donee beyond the power of the donor to recall. In the case of a gift *causa mortis* absolute title does not immediately take effect, and is subject to the will of the giver; in the event of death the title passes to the donee, but until that time the donor has the power to dispose of the property as he wishes. The court in this case ruled that there was sufficient delivery, the gift being in the hands of a third party, the bank. The judgment therefore was in favor of the bank and the beneficiary.

In general a testator in good health and having sufficient time at his disposal would naturally arrange for his bounty after death by utilizing either the written, attested will or the holographic will, the latter being a will written in the handwriting of the donor, requiring no witnesses, and deposited among his valuable papers for reference at the proper time. The nuncupative will, such as the one involved in the case discussed above, is applicable only to personal property and is resorted to by sick persons in anticipation of death. This type of will is legal in the State of North Carolina, but in order to prevent fraud is surrounded by numerous legal requirements as to the act of disposition and also as to probation. Briefly, the person desiring to make an oral will is required to secure two competent persons who must be charged by him to "bear witness" to the transaction, and his wishes must be reduced to writing for the purpose of probation within ten days.

Inasmuch as physicians are frequently in a position to help in such matters, a knowledge of the fundamentals of testamentary disposition of property is desirable. In emergencies due to illness, where neither time nor the testator's condition is such as to enable him to write or dictate his wishes, the attending physician may be called on to "bear witness" to a nuncupative will. (Supreme Court of Michigan, V. 295 N.W. Reporter, p. 266, December, 1940.)

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# TUBERCULOSIS ABSTRACTS

## *A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX March, 1947 No. 3

MANY family physicians with long experience have entertained more than a mere suspicion that individuals belonging to certain families show relatively little resistance to infection with the tubercle bacillus. Now statistical evidence to support such an observation has begun to accumulate. This is of practical importance to both physicians and health officers since a case of tuberculosis in such a family calls for an intensification of all protective measures if spread of the disease within that family is to be prevented.

### SPREAD OF TUBERCULOSIS IN FAMILIES OF TUBERCULOUS PATIENTS

A tabulation of the family records of patients with active tuberculosis under the supervision of the Los Angeles County Health Department has uncovered some surprising facts regarding the susceptibility of the members of certain families to the spread of this disease.

The figures show that nearly all of the new cases originate in a comparatively small proportion of the families exposed. These susceptible families deserve earnest study. Preventive measures within them can be successful only as they are directed toward the major elements of spread. What these elements are is still unknown. A family is a complex unit, exhibiting characteristics, traits, and habits that have been in operation for generations. Even though the faults of these families may not be easily corrected, if they can be defined so as to be recognized, they can be made the object of intensive health supervision. If tuberculosis is to be prevented among them, these families must have larger proportions of the tuberculosis prevention budget than is ordinarily allotted to them.

It is characteristic of tuberculosis in Southern California that it is concentrated in a few comparatively congested areas, inhabited chiefly by families in the low income brackets. Here many conditions favor the spread of disease. In planning surveys and applying special preventive measures, tuberculosis attack rates must be given careful consideration. Local surveys in Los Angeles with a house-to-house canvass in poor neighborhoods have detected five times as much active pulmonary tuberculosis as has been found by the same amount of effort expended in other types of surveys. More information about the reasons for spread in the homes where tuberculosis thrives is urgently needed. In these homes, the wage-earner, all other adults and the older children must be examined.

Crowded living quarters constitute a major fault. In spite of improvement, economic conditions must still be considered a factor. Although thousands of these families have moved to modern housing projects and many have been earning big wages, too often they have reverted to old living habits within the new dwellings. These habits have been gradually molded into characteristics that will require long and painstaking efforts to change.

In 1940, the Los Angeles County Health Department analyzed the family records of all the cases of active reinfection type tuberculosis. All cases found in the family within six months of the time that the first case in the family was diagnosed in the clinic were regarded as original cases. Only those detected thereafter were considered new cases whose infection was presumably due to exposure during the period of observation. Contacts with no active tuberculosis were not included in the tabulations unless they had been under observation six months or longer.

There were 506 families with 595 original cases and 1,637 other persons exposed. There were 135 new active cases developing among these exposed persons, or 8.25 per cent. Of these, four were active nonpulmonary, 45 were active primary and 86 active reinfection type pulmonary tuberculosis. In other words, slightly more than five per cent of the 1,637 contacts developed active reinfection type pulmonary tuberculosis six months or more after the discovery of the first known case in each of the respective families.

These data cover experience during the latter half of the 1931-1940 decade, during the worst years of the depression. Now, four years later, the present active cases have been analyzed, eliminating the families previously tabulated. Unquestionably, there was improvement in the economic status of these families. There was less cause for congestion within the home, and with better living conditions and improved nutrition there should have been less likelihood of the spread of infection. The average number of months of exposure of contacts was also less, because of improvement and extension of the isolation technique. In spite of all this the results show that the justifiable prediction of a lower attack rate would be in error. In 431 families with 1,264 contacts, 60 cases of active reinfection type pulmonary tuberculosis developed among the contacts, or an attack rate of 4.75 per cent. This is very little lower than the rate found in the previous survey.

The hazard in these families with this high attack rate is apparently not only due to the direct spread of the infection, but to other conditions favoring the spread. There must be some inherent fault either in their physical or their mental make-up which makes the members of these families more susceptible than the average person; or there may be contributory domestic habits unchanged by the usual public health education and supervision.

Conditions in other families in similar communities were found to be quite different. The X-ray surveys previously mentioned were carried on in the most congested parts of these same areas, and 22,000 persons examined showed an attack rate of 0.5 per cent. The greater tendency to spread in certain families, in comparison with other families, is demonstrated by the fact that in families having more than one case, even where no positive sputum can be found, there is a high attack rate.

With this high attack rate in certain families, it would seem justifiable to isolate outside of the home every active case occurring in a family with a history of considerable tuberculosis. The effectiveness of such a ruling was shown in a small neighborhood where nine deaths occurred in eighteen months. An arbitrary edict was issued that no active case would be permitted to remain at home in that neighborhood. This stopped the spread and there have been no new cases. In another district, where there were a number of ex-sanatorium, chronic, advanced, communicable cases it was found possible to isolate within the homes with extra assistance. This procedure was found to be effective in stopping the spread of infection. In this type of family isolation is essential. The cases found should not be permitted to remain at home unless considerable material assistance is available and intensive supervision is supplied.

**Spread of Tuberculosis in Families of Tuberculous Patients, P. K. Telford, M.D. and Ruth Garten-White, M.D., American Review of Tuberculosis, March, 1946.**

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# CORRESPONDENCE

VETERANS ADMINISTRATION
310 W. Fourth Street
Winston-Salem, N. C.
March 7, 1947

To the editor:

The Veterans Administration has established a goal of "Medical Service Second to None" in order to insure that veterans who served this country in time of war receive proper medical attention. The attainment of this goal in North Carolina, as well as elsewhere, will be extremely difficult unless qualified physicians associate themselves with this program.

I am hoping that we will be able to reach interested doctors through the pages of the North Carolina Medical Journal. There exists immediate need for physicians in our out-patient clinics at Winston-Salem, Charlotte and Durham, North Carolina. Doctors in these cities will be considered for full time or part time association with the Veterans Administration.

An adequate salary with periodic pay increases, numerous professional advantages and other factors, we feel, will interest physicians who heretofore lacked information about the Medical Program of the Veterans Administration. Full details may be obtained from the Manager of the Veterans Administration, Sub-Regional Offices in Charlotte and Durham or from the Personnel Officer, Veterans Administration, Regional Office, Winston-Salem, North Carolina. I will be glad to answer any inquiries from physicians in this regard.

North Carolina has more than 340,000 veterans of World War II and over 70,000 veterans of other wars. In the interest of those who require medical attention or treatment, I am making this appeal to doctors to associate themselves in our program.

Very sincerely yours,
A. J. Weirick, M.D.
*Chief Medical Officer*

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## THE STATE SOCIETY MEETING

March 7, 1947

Dr. Robert M. Fales, President
New Hanover County Medical Society
Wilmington, North Carolina

Dear Dr. Fales:

I enclose the card sent out by the New Hanover County Society. It may not be returned without comment.

Had your Society offered the State Association 500 beds at Wrightsville for the annual meeting, that would have been valuable constructive criticism. As it is you offer nothing except destructive criticism and ignore the tremendous expenditure of thought, time, planning and effort on the part of our State Medical Society Executive Committee. Furthermore, the question is so worded that the results might easily be interpreted in any way desired.

There is sufficient strife, bitterness, wrangling and contentiousness in the land already without deliberately seeking to add more. Let's leave that sort of thing to the textile unions and the United Mine Workers.

To a casual observer this looks like an effort on the part of a small group of doctors to discredit the duly elected and hard working officers of the State Medical Society. It might seem that the New Hanover County Society might more gracefully either secure adequate accommodations for the meeting at their own beach or remain away from the Virginia Beach meeting in dignified silence.

Very truly yours,
S. F. Ravenel, M.D.
Jean McAlister, M.D.

CC: North Carolina Medical Journal,
Winston-Salem, N. C.

# BULLETIN BOARD

## PRESIDENT'S MESSAGE

### DINOSAURS

It is the custom of Dr. Kelsey Regen, the able and beloved minister of the First Presbyterian Church in Durham, to present a five-minute sermon for the children at each Sunday morning service. A few Sundays ago he announced to the children that he wished to speak to them about dinosaurs. Without attempting to quote him, I wish to try to reconstruct his little sermon as I recall it, placing some emphasis upon the points he made as I remember them.

Said Dr. Regen, "I wish this morning to speak to you children about dinosaurs. How many of you have seen pictures of dinosaurs?" Every child had. "You know that many, many years ago there were thousands upon thousands of dinosaurs roaming all over the earth. They were large, powerful beasts. But somehow they disappeared. Today there is not a single dinosaur in the whole, whole world. Can anyone tell me why they disappeared, why there is none today?"

A smart little boy answered, "Their bellies were too big and their heads were too little." Said the kindly minister, "That may be true, but I hardly think that is why they disappeared. In all these pictures of dinosaurs that you have seen, what are they always doing?" A smart little girl said, "Fightin'." "That is right," said the good preacher, "and that is where we may find the cause of their disappearance."

He continued, "It seems that dinosaurs did not get along very well together. They always had arguments. One dinosaur never was willing to help another. Every one had his own ideas and was ready to fight every one who did not have the same views. It was always one against the others. They were probably not all bad, but they just could never get together and work as a team. Maybe they were not all opposed to each other; but each likely had some 'reservation,' however slight, that kept him from quite going along with those around him. This led to arguments.

"Then too, the other beasts of the day soon learned that the dinosaurs were not united. They did not respect them and found them easy prey. If they attacked a dinosaur they could defeat him because one dinosaur seldom helped another.

"And so it went on, ages upon ages, and the dinosaurs gradually lost ground. They had no unity of purpose. It was every dinosaur for himself. It never dawned upon them that they might unite and help each other. As a result of all of this, they just simply disappeared—ceased to exist, because they couldn't get along together."

And then the good preacher said, "You children know that for years and years and years, we have had bees and ants, and today there are very many of them. They seem to be doing fine. Do you know why they are doing so well; why they are leading such happy lives?"

Each little hand went up, because every little child knew the answer.

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## FREDERIC MOIR HANES

The dedication of this issue of our JOURNAL to the memory of Dr. Fred Hanes will meet with widespread approval of the membership of the Society. The editorial board is to be congratulated.

Duke University and the State of North Carolina suffered a great loss in the passing of Dr. Hanes on March twenty-fifth of last year. A native North Carolinian, he rendered valuable service to his state as a physician and teacher of medicine. His scientific attainments resulted in many honors' being conferred upon him, not only in his native state but throughout the nation.

It was not my privilege to have many close professional contacts with Dr. Hanes, but his colleagues knew him as a keen clinician and an able teacher. He inspired his students to a high type of scientific endeavor. His work will remain a tradition in the Duke Medical School that will stimulate his associates and students for many years to come.

Socially, he was a cultured gentleman who was most considerate of those about him. On the golf course, he was an earnest golfer who loved the game, companionable and pleasant; it was always a pleasure to play with him. In this sphere I knew him best and I shall always cherish the association of the games we had together.

Dr. Hanes had a breadth of vision and loyalties that marked him as a truly great man. He was interested in all things that made for better medicine and its wider distribution to the masses of the people. He made contributions to Duke University and to the state that must be perpetuated. His life and work will, for years to come, set an example for accomplishment that many will strive, with credit, to equal, but few will attain.

W. M. COPPRIDGE, M.D.

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## STATE BOARD OF MEDICAL EXAMINERS

The next meeting of the Board of Medical Examiners of the State of North Carolina for the purpose of licensure by endorsement of credentials will be held on Thursday, May 1, 1947, at the Sir Walter Hotel in Raleigh. The meeting set for April 30 in Winston-Salem has been cancelled.

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An extra session of the North Carolina State Board of Medical Examiners was held at the Sir Walter Hotel in Raleigh, January 15, 16, and 17, 1947. Sixty-three physicians were licensed by endorsement of credentials. Seven physicians were declined license because of failure to meet the requirements of the board or failure to graduate from a class A medical school. Two of these were foreign graduates.

Dr. M. was called before the board on account of repeated narcotic violations and other offenses. The license of this physician had been revoked by a former board. The physician claimed reinstatement but was advised of his error and warned not to practice medicine. Councilor Donald B. Koonce of Wilmington assisted the board in the hearing of this case.

The case of Dr. A., who had been convicted in Haywood County on the charges of fornication and adultery and maintaining a building for prostitution and assignation, was heard. The physician's three attorneys presented eleven witnesses who testified generally that the physician was in good standing except for the single Haywood County affair. There were no prosecuting witnesses, only the evidence of admission and conviction in the court record. After due deliberation and consideration of all the facts, the board ordered the license of Dr. A. to be revoked and rescinded; this order was suspended, however, upon condition that Dr. A. "be and remain of good behavior; that he not violate any criminal law; that he be of good moral conduct, and that he practice medicine on a high professional plane and in an ethical manner for a period of five years from this date."

The following resolution was passed and forwarded to the Medical Care Commission:

"BE IT RESOLVED: That the State Board of Medical Examiners endorses the entire plan as recommended by the Medical Care Commission. The board realizes that the Medical Care Commission has made a thorough study and outlined a competent program based upon the great need for additional facilities and medical personnel in North Carolina. The State Board of Medical Examiners realizes the fact that an adequate number of physicians have not been obtained by the sources available within and outside of the state."

## THE NORTH CAROLINA LEAGUE FOR CRIPPLED CHILDREN

Every year the North Carolina League for Crippled Children joins in the national sale of Easter seals, proceeds of which are used in a continuous program to advance the welfare of crippled children and adults. This year the sale is being put on from March 6 to April 6.

The North Carolina League for Crippled Children is a private charitable organization that cooperates with but does not duplicate the work of other public or private agencies. It aids the crippled throughout its area of all ages, races, and creeds, whether crippled through birth, disease or accident. Its only condition for aid is a valid need not otherwise provided for. Its only source of funds is voluntary contributions received from the annual sale of Easter Seals.

The sale of Easter seals offers an opportunity for all citizens to share in this important work of building crippled children into happy and useful men and women. If you have not received seals in the mail and wish to contribute, write the North Carolina League for Crippled Children, Box 839, Chapel Hill, N. C.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

Available from the state office is a well illustrated pamphlet entitled "Surgery in Tuberculosis" prepared by Dr. R. H. Overholt and Dr. N. J. Wilson. It discusses the following surgical procedures: phrenic nerve paralysis, pneumothorax, pneumonolysis, thoracoplasty, lobectomy, pneumonectomy, pneumoperitoneum, extrapleural pneumothorax and cavity drainage. The price is $8.00 a hundred or 10¢ each in units of less than one hundred.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

The Duke Medical Alumni will hold their second reunion on April 24, 25, and 26. The following program will be presented by Duke graduates and men who trained at Duke.

Thursday morning, April 24
  Registration
Thursday afternoon
  Dr. O. J. Bateman ('39)—"Use of B.A.L. in Gold Poisoning"
  Dr. Charles Styron ('38)—"The Genito-Urinary System in Diabetes Mellitus"
  Dr. George Harrell ('36)—"Plasma Volume and Extravascular Thiocyanate Space in Rickettsial Spotted Fever"
  Dr. B. B. Dalton ('32)—"Meeting the Problems of the General Practitioner"
  Dr. P. B. Parsons ('36)—"Intra-Abdominal Herniation: Its Radiological Diagnosis"
  Mock Clinic (by junior and senior students)
  Class and/or Departmental entertainment
Friday, April 25
  Dr. George Gilbert (house officer, 1939-44)—"The Cellular Changes in Carcinoma of the Prostate Following Hormonal Therapy"
  Dr. Paul Reque ('34)—"An Evaluation of the Use of Antibiotics in Dermatology"
  Dr. J. S. Hiatt, Jr. ('40)—"Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis"
  Dr. David Wilson (house officer, 1942-46)—"Lucite Balls in the Treatment of Pulmonary Tuberculosis"
  Dr. Harold H. Kuhn ('40)—"Open Versus Closed Treatment of Acute Osteomyelitis"
  Exhibits
  Business Meeting
  Presentation of New Officers
  Reunion of 65th General Hospital and 38th Evacuation Hospital—
  Open House—Local Alumni
  Dinner-Dance—Hope Valley Country Club
Saturday, April 26
  Dr. Eleanor Easley ('34)—"A Study of Maternal Morbidity with the Use of Caudal Anesthesia"
  Dr. Robert H. Pudenz ('35)—"Cranial Trauma and Brain Movement. Direct Observation of the Brain with High Speed Cinematography"
  Dr. R. H. Rigdon (house officer, 1931-35)—"Consideration of the Mechanisms by which a Rapid Diminution Occurs in the Parasitemia in Ducks Infected with P. Lophurae"
  Dr. David A. Young (house officer, 1935)—Title later
  Dr. Charles W. Hock ('41)—"Radiation Injuries of the Intestines"
  Duke-Navy Baseball game

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Dr. James G. Whildin was appointed to the staff as associate in radiology on January 21, 1946, after spending five years in the army.

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The Technical Division of the Department of Radiology, under the supervision of J. B. Cahoon, Jr., R.T., has increased lectures and demonstrations in order to offer postgraduate instruction to outside technicians who need refresher courses. Two students are admitted for the accredited course in x-ray technical training each March and October. A nursing degree, college diploma, or former technical training is a prerequisite.

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Miss Helen Kaiser, director of physical therapy, has recently returned from Greece, where she was active in the Near East Foundation. The Foundation has established a Physical Therapy School, which has been set up by experienced American personnel. Adequate supervision will be given to the students during their training and first years of work experience. The course has been set up to meet the requirements of the American Medical Association, and upon completion of their present course of twelve months two students will be selected for further study in physical therapy at Duke University.

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Dr. Watt W. Eagle addressed the Southern Section of the American Laryngological, Rhinological and Otological Society on January 6 at Miami Beach. His topic was "Elongated Styloid Process—Further Observations and a New Syndrome."

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

The Board of Trustees of the North Carolina Baptist Hospital and the Board of Trustees of Wake Forest College met on March 11, 1947, and adopted the following resolutions:

"1. That this group here assembled recommends that the hospital and medical school be relocated on Graylyn Estate adjacent to the new Wake Forest College campus; and

"2. That a general campaign be launched immediately for the purpose of raising $6,000,000 from individuals, foundations and other sources to provide funds for a complete plant in the new location; and

"3. That the campaign for funds be a joint effort with Wake Forest College in connection with raising funds to move Wake Forest College to Winston-Salem."

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Dr. C. C. Carpenter, dean, recently announced the appointment of Dr. Henry Shepard Fuller of Washington, D. C., as assistant professor of preventive medicine. Dr. Fuller will assume his duties on October 1. Dr. Fuller is at present taking a course at the London School of Hygiene and Tropical Medicine, as recipient of the Moseley Traveling Fellowship from Harvard University for 1946, which entitles him to a year's study in Europe.

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Dr. Franklin Henley has been appointed to the staff as instructor in clinical pediatrics. He is a graduate of Davidson College, the Medical School of the University of North Carolina, and Harvard University School of Medicine.

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Dr. W. C. Thomas of the Department of Pathology has been granted a year's leave of absence, effective July 1, 1947, for further study in one of the country's leading universities.

## FOURTH DISTRICT MEDICAL SOCIETY

The Fourth District Medical Society met in Goldsboro on February 14. Dr. Reno Porter of Richmond, Virginia, was guest speaker. Officers of the Society are Dr. Claiborne T. Smith of Rocky Mount, president; Dr. Herman F. Easom of Wilson, vice president; and Dr. Robert M. Whitley of Rocky Mount, secretary-treasurer.

## CATAWBA VALLEY MEDICAL SOCIETY

The Catawba Valley Medical Society held its regular meeting in Lenoir on February 18. Speakers on the program were Dr. Charles M. Kendrick, Dr. Shelton Fowler, Dr. Ralph E. Lore, and Dr. Frederick M. Dula, all of Lenoir. A film on sulfathalidine in the treatment of ulcerative colitis was also presented.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

The regular monthly meeting of the Edgecombe-Nash Counties Medical Society was held in Rocky Mount on February 12. Dr. C. W. Bailey presented a paper on "Problems of Deafness in Children," and Drs. C. T. Smith and W. S. Wall discussed the question of whether or not a colored hospital is needed in Rocky Mount.

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. Leland S. McKittrick, associate professor of surgery at Harvard Medical School, was guest speaker at the meeting of the Forsyth County Medical Society held in Winston-Salem on February 11. His subject was "The Diagnosis and Treatment of Surgical Conditions of the Biliary Tract."

## HALIFAX COUNTY MEDICAL SOCIETY

The Halifax County Medical Society held its regular monthly meeting in Roanoke Rapids on February 14. Dr. Paul Douglas Camp of Richmond, Virginia, discussed the "Differential Diagnosis of Rheumatic Fever and Syphilitic Heart Disease."

## NEWS NOTES

Dr. Henry Stuart Willis, superintendent of the William H. Maybury Sanatorium in Northville, Michigan, has been selected to succeed the late Dr. Paul P. McCain as superintendent of the three state tuberculosis sanatoria. Dr. Willis was born near High Point, North Carolina, and is a graduate of the University of North Carolina and Johns Hopkins Medical School. He has been associated with the Maybury Sanatorium for the past seventeen years. He will assume his new duties on April 15.

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Drs. I. M. Procter and Kenneth Dickinson of Raleigh have announced the association of Dr. Guy Hewitt Branaman in the practice of obstetrics and gynecology.

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Dr. Millard Jones of Red Oak has recently become associated with Dr. W. S. Wall of Rocky Mount.

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Dr. Jane Gregory Marrow has opened offices for the practice of obstetrics and gynecology in Rocky Mount.

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Dr. W. K. McDowell of Tarboro has announced the limitation of his practice to diseases of the ear, nose, and throat.

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Dr. George H. Wadsworth is chief surgeon of the new Roanoke-Chowan Hospital in Ahoskie.

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Drs. Robert A. White and Harmon J. Bailey of Asheville have announced the opening of their new offices for the practice of obstetrics and gynecology.

## SECTIONAL MEETING OF THE AMERICAN COLLEGE OF SURGEONS

Drs. Keith S. Grimson and Deryl Hart of the Duke University School of Medicine appeared on the program of the sectional meeting of the American College of Surgeons, held in Baltimore, March 10 and 11. Dr. Grimson spoke on "Limitations of Transthoracic Vagotomy for Peptic Ulcer," and Dr. Hart presided over a panel discussion on "Postoperative Care."

## ARMY MEDICAL LIBRARY MICROFILM SERVICE

During the war, the army medical library through its photoduplication services supplied millions of pages of microfilmed medical articles to the armed services and other research agencies.

This service is now generally available for civilian physicians, institutions and research workers on a cost basis. This means direct access to the library's enormous resources of medical literature.

A fee of fifty cents is charged for filming any periodical article in a single volume, regardless of length. Microfilming from monographs is furnished at fifty cents for fifty pages or fraction thereof. Photostats are also available at a charge of fifty cents per ten pages or fraction thereof.

For convenience and to keep bookkeeping costs down, a coupon system has been established. Users may buy any quantity of photoduplication coupons at fifty cents each. Order blanks are available upon request. Checks should be made payable to the Treasurer of the United States, and sent to the Army Medical Library, Seventh Street and Independence Ave., S.W., Washington 25, D. C.

(BULLETIN BOARD CONTINUED ON PAGE 189)

# AUXILIARY

## ORGANIZATION

### *A Challenge to Doctors' Wives*

The work of the Auxiliary, which is under the guidance of the State Medical Society and the American Medical Association, has materially increased in the past few years; and in order to be of greater assistance to the medical profession in North Carolina we need to enlarge our organization. We need the added strength and influence of an auxiliary in every county that has a medical society.

First, let us review briefly the history of the Auxiliary, its present status, and its future possibilities of growth. This review, perhaps, will give an overall picture of "why" the Auxiliary was formed and will justify its existence.

Someone has said, "No organization can be greater than the cause which brings it into existence, and no group springs suddenly into usefulness but is the gradual outgrowth of ideas that have lived because of their worth."

The Auxiliary to the Medical Society of the State of North Carolina will soon celebrate its twenty-fourth anniversary, having been organized April 18, 1923, in Asheville, with Mrs. P. P. McCain as organizing chairman and first president. There were 53 charter members.

The primary object of the Auxiliary at the beginning was purely social, but as time passed the feeling grew that the demand for a broader vision, greater incentive, and keener endeavor was a challenge to an organization of intelligent women. So as the years have passed, the Auxiliary has grown, not only in membership but in its scope of work, which today embraces social, educational, and philanthropic activities.

It has long been our ambition to reach a membership of 1000. Last year we missed this goal by less than 50. Certainly we should "go over the top" this year.

We now have 28 organized counties; 7 of these were organized last year (5 in the Fifth District), and 1 was reactivated. While this increase is most gratifying, there are still many unorganized counties with active medical societies which would welcome an auxiliary. In the one hundred counties of the state, there are sixty-eight component medical societies or units, representing eighty-one counties. (In some instances two or three small counties are combined; an auxiliary would follow the same pattern.) So we have vast opportunity to expand, and there is an urgent need to do so if we are to go steadily forward.

These, briefly, are the ways in which *you* can help:

Join your local auxiliary.

If your county does not have an auxiliary, help to organize one—today!

If this is impossible, become a member-at-large by sending your dues of $1.00 to the treasurer, Mrs. E. C. Judd, 2108 Woodland Avenue, Raleigh.

We support an organization only when we belong to it and are interested in its objectives and tasks.

Perhaps you have used the argument that women throughout the United States are over-organized, and you have no time for anything more. While it is true that as a doctor's wife you are a busy person and have cares and responsibilities that the average layman's wife does not have, yet what other group—study, civic, or social—should rate priority over your husband's chosen profession?

Through an organization you keep in touch with national, state, and local activities, getting a clearer perspective of its tasks and accomplishments. An organized unit is a medium through which work can be planned and reported.

An Auxiliary member has many opportunities to extend and interpret the aims of the medical profession to other organizations. Today it is very important to direct public thinking and actions in channels approved by the medical profession.

It is manifest that Auxiliary members have experienced much pleasure in the part they have played in keeping guests in the three sanatoria beds and in supporting the Student Loan Fund, not to mention the pleasure derived from social contacts and from becoming better acquainted. These are only a few of the advantages of being an Auxiliary member. The Auxiliary needs *you*; you need the Auxiliary.

Let's try to make this a banner year in organization. To do so, we need the cooperation of every doctor's wife in North Carolina. The accomplishments of the past, the objectives of the Auxiliary, and the manifold opportunities before us are a challenge not only to keep intact the precedents set by our predecessors but to forge ahead to do bigger and better things.

"Let us not be weary in well doing."

Mrs. Erick Bell,
*Chairman of Organization*
Wilson

* * * *

Haddon Hall will be the headquarters for the Annual Meeting of the Woman's Auxiliary to the American Medical Association, which will be held in Atlantic City, New Jersey, June 9-13, 1947.

Requests for reservations should be sent immediately to Dr. Robert A. Bradley, Chairman, Subcommittee on Hotels, 16 Central Pier, Atlantic City, New Jersey.

# BOOK REVIEWS

**The Compleat Pediatrician.** By W. C. Davison, Professor of Pediatrics, Duke University School of Medicine: formerly acting Pediatrician in Charge, The Johns Hopkins Hospital. Ed. 5. Price, $3.75. Durham, N. C.: Duke University Press, 1946.

It is difficult to conceive of a text which could contain more useful and readily accessible information than the new fifth edition of **The Compleat Pediatrician.** The book is completely cross-indexed, so that differential diagnosis from symptoms is allowed and the salient points of each disease and up-to-date therapeutic measures are provided. There are also sections on general supportive treatment and nursing care containing a wealth of practical information derived from the author's wide experience and careful observations in pediatric practice.

The chapters on laboratory and analytic procedures are comprehensive and yet precise. The sections on nutritional requirements, feeding, and diet include schedules and recipes, not only for the normal pediatric patient but for those having nutritional and metabolic disturbances. Much of the information is presented in easy-to-utilize, tabular form. A list of the drugs and prescriptions most frequently used in pediatrics completes the text.

This small volume is unique in presenting so simply the essentials of pediatrics. It cannot help but enjoy the enthusiastic reception accorded the earlier editions. It is unreservedly recommended to all students and practitioners of medicine, and is a **must** for pediatricians.

**Their Mothers' Sons.** By Edward A. Strecker, M.D. 220 pages. Price, $2.75. Philadelphia and New York: J. B. Lippincott Co., 1946.

This is the most forceful, hard hitting, "straight from the shoulder" book published in a long time. If it enjoys the popularity which it deserves it could easily be one of the important books of the present generation in America.

Dr. Strecker has analyzed the revered American "mom" and has uncovered, in a very logical manner, the fact that she is not really a very lovable or admirable character. He carefully distinguishes the real mother from the mom, the latter being a "woman who has failed in the elementary mother function of weaning her offspring emotionally as well as physically." He characterizes her as one who "derives [her emotional satisfaction] from keeping her children paddling about in a kind of psychological amniotic fluid rather than letting them swim away with the bold decisive strokes of maturity from the emotional maternal womb," and finally indicts her for her "failure to prepare the child to meet even the minimal demands of adult life."

The importance of this problem is emphasized by the fact that 500,000 men attempted to evade the draft, almost 2,000,000 were rejected for psychiatric disorders, and 600,000 were discharged for neuropsychiatric reasons. Most physicians who had experience with Selective Service either in the army or as civilians will agree that poor training and mental habits inculcated by their parents were responsible for the deplorable mental state of these men.

The author gives a body blow to progressive education in its worst form, calling attention to the obvious, but often overlooked fact that "the only time the 'musts' and 'must nots' of the world . . . can be learned is during childhood."

Occasionally one comes across paragraphs which seem to have been written for physicians as parents. With many busy physicians' children being reared almost exclusively by their mothers, this book deserves the careful attention of every doctor with children. The author shows how easy it is for a wife who is rearing a family with little help from her husband to fall into the ways of "momism" in spite of excellent intentions and education.

Dr. Strecker is a rare character among medical authors. He has something to say and he knows how to say it. This book is not only enlightening but very readable. It is recommended **summa cum laude** to physicians, parents, and all people who have any dealings with children.

**Uterine Contractility in Pregnancy.** A Study of the Contractions of Pregnancy and Labor Under Normal and Experimental Conditions. By Douglas P. Murphy, M.D., F.A.C.S., Assistant Professor of Obstetrics and Gynecology and Research Associate in the Gynecean Hospital Institute of Gynecologic Research, University of Pennsylvania. 130 pages, with 64 illustrations. Price, $5.00. Philadelphia: J. B. Lippincott Company, 1947.

This volume represents a collection of the numerous studies which have been carried out by Dr. Murphy with the Lorand tocograph. It represents an analysis of more than 3,200 individual records of uterine contraction taken during pregnancy and labor, augmented by studies of those drugs most commonly employed in an obstetric practice. The material contained in the book represents much of clinical value when it is applied to the management of obstetric problems.

Abnormal deficiency of uterine contractions, with prolongation of labor in the absence of a mechanical obstruction, is present in approximately one patient in twenty-five. It often leads to undue difficulties when the problem is not recognized early in labor and the labor treated accordingly. Murphy points out that this group of patients can be recognized clinically by variation in the type of uterine contraction from the very beginning of labor.

The material in this excellently prepared and arranged monograph is of extensive clinical value for the practical management of obstetric patients, and the book is an excellent academic publication for the student of obstetrics.

**All but Me and Thee.** By Brig. Gen. E. D. Cooke. 215 pages. Price, $2.75. Washington: Infantry Journal Press, 1946.

The author of this book was ordered by General Marshall to investigate completely the problem of psychoneurosis in the army of World War II. When General Cooke gave his final report, the unique Chief of Staff said to him, "When the necessity no longer exists for keeping these matters confidential, you owe it to our people to share your knowledge with them." This book is the result.

General Cooke interviewed everyone concerned with the problem, from the foxholes all the way to Washington. The subtitle of the book, "Psychiatry at Foxhole Level," may be misleading, since 80 per cent of the psychoneurotics in the army never were overseas and certainly never near a foxhole.

One might criticize the author on two points. The first is his almost benign attitude toward hospitals which returned a large percentage of psychoneurotics to full duty without regard to the men's welfare or that of their organizations, in order to have their record of "men returned to duty" high enough to get the C.O. his Legion of Merit. The other is his naive conclusion that certain 4-F's, such as athletes and crooners, were merely victims of publicity and were so classified only because they did not meet the minimum induction standards. This is extremely difficult to believe in view of the fact that combat infantrymen with old ear-drum perforations, marked hearing defects, and "trick" knees could not be relieved from front-line duty in spite of every effort by their surgeons.

This book will be of interest to the veteran doctor as well as to the non-veteran doctor interested in the psychoneurosis of soldiers. The story of the army's handling and mishandling of that problem is interestingly told in conversation which reads more like a novel than non-fiction. The various technical points of psychiatry are kept remarkably straight by the author's collaborators, who include W. C. Menninger, Brill, Strecker, and other well-known psychiatrists.

### Book Catalogue

Chemical Publishing Co., Inc., 26 Court Street, Brooklyn 2, N. Y. has just issued their new 1947 catalog. The catalog includes the latest books on chemistry, technology, physics, general science, mathematics, engineering, foods, formularies, drugs and cosmetics, medicine, metals, technical dictionaries, etc., as well as college and other textbooks.

Librarians, technical and scientific workers will find this catalog especially useful as it conforms with many of their specific needs in listing the date of publication of each book, as well as price, number of pages, descriptions and full table of contents.

Keep up with the last developments in science and industry by writing direct to the publisher for a free copy of this catalog.

# BULLETIN BOARD

(CONTINUED FROM PAGE 186)

## AMERICAN COLLEGE OF CHEST PHYSICIANS

The Thirteenth Annual Meeting of the American College of Chest Physicians is scheduled to be held at the Ambassador Hotel, Atlantic City, New Jersey, June 5 to 8. An interesting scientific program has been planned for this meeting. Prominent speakers from other countries will present papers.

The oral and written examinations for Fellowship will be held on the first day of the meeting, June 5. Applicants for Fellowship in the College who plan to take these examinations should communicate at once with the Executive Secretary, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

The Convocation for new Fellows and Life Members of the College will be held on Sunday, June 8. At this time certificates will be awarded to Fellows and Life Members admitted since June, 1946.

## AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

The Fourth Annual Meeting of the American Society for Research in Psychosomatic Problems will take place on May 3 and 4, 1947, at Haddon Hall, Atlantic City. A morning and afternoon session are scheduled for Saturday, May 3, and the Annual Dinner will be held that evening. A panel discussion will be conducted Sunday morning.

The Society is particularly fortunate in having Dr. James L. Halliday of Scotland as one of its guest speakers. His research in psychosomatic medicine is well known, and his numerous articles have been published in medical journals here and abroad.

No registration fee will be required. Room reservations may be made directly through the hotel or the American Society for Research in Psychosomatic Problems, but dinner reservations must be made through the Society's office at 714 Madison Avenue, New York 21, New York.

## NATIONAL MENTAL HEALTH FOUNDATION

An expanded program of public education on the problems and needs of mental patients will be undertaken by the National Mental Health Foundation through grants of $25,000 each from Carnegie Corporation of New York and the Rockefeller Foundation, Harold Barton, executive secretary of the nonprofit mental health organization, announced recently.

Started in April, 1944, by a group of young volunteer attendants in a Pennsylvania state mental hospital, the Foundation has a three-point program: (1) to inform the public on the need for more progressive and humane treatment of mental cases; (2) to secure adequate mental health facilities in every state; and (3) to encourage better training for attendants in mental hospitals.

**DOCTOR WANTED**—The town of Waxhaw in Union County is without a doctor. A physician locating in Waxhaw would serve between 5000 and 6000 people and would have the facilities of the hospital in Monroe, twelve miles distant, at his disposal. Anyone interested in this location should write Mr. Robert Howie, Waxhaw, N. C.

## AMERICAN FOUNDATION FOR TROPICAL MEDICINE

To encourage the study of tropical medicine and to stimulate research into new methods of treatment and control, the facilities of the new $250,000 Liberian Institute will be open to students and scientists of all lands without distinction as to color, race or creed. Its research findings will also be available to all who are interested.

Construction of the Institute's buildings, a gift from Harvey S. Firestone Jr., as a memorial to his late father, will be started this year on a 100-acre site adjoining Roberts Field, international airport of West Africa. This land, together with an additional 600 acres of choice farming land, is a tax-free gift from the Liberian Government, which has agreed to cooperate fully with the work of the Institute.

A campaign for $250,000 to cover the first year's operations is now in progress by the Foundation, whose offices are located at 270 Madison Avenue, New York 16, N. Y. Industries with an interest in tropical medicine and economy will be asked to support the work of the Institute, whose scientific program will be guided by a committee made up of representatives of seventeen universities, the army and navy medical services, the U. S. Public Health Service, and industries interested in the development of this phase of medicine. Included in this group are Dr. Thomas T. Mackie, representing the Bowman Gray School of Medicine, and Dr. Donald S. Martin, representing the Duke University School of Medicine.

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## GROWTH OF BLUE CROSS IN STATE AND NATION

Over 55,000 North Carolinians were added to the membership rolls of the Hospital Saving Association during 1946, a record year for the organization. Enrollment in the state totals 315,000 members, now protected against hospital bills. Of this number, 180,000 are also protected against surgical claims. One out of every 11 North Carolinians is protected by the Chapel Hill Blue Cross Plan. Fifty per cent of the population of Winston-Salem is covered by the Association.

Blue Cross Hospital Service gained 5,887,219 new members in 1946 to establish an all-time enrollment record, Richard M. Jones, acting director, Blue Cross Commission, American Hospital Association, announced recently in Chicago. Membership increases in each quarter were greater than in any previous quarter in Blue Cross history. The highest gains on record were set in the second and fourth quarters, with enrollment of one and three fourths and one and one half million members, respectively.

In releasing the enrollment figures, Jones said, "Blue Cross growth for 1946 represented the enrollment of 45 members each working day minute. This phenomenal growth clearly demonstrates the success of voluntary methods in providing a means of prepayment for hospital care as protection against the financial hazards of unexpected illness. Total membership is now 25,876,424, indicating that one person in five is a Blue Cross member.

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Sites now have been selected for 68 of the 75 new hospitals which Veterans Administration is authorized to build and for which funds have been appropriated.

## FIRECRACKER VICTIMS

A survey conducted by the Hospital Care Association, a non-profit Blue Cross organization serving North Carolina, recently disclosed that more than 700 patients were treated for injuries resulting from fireworks in North Carolina during a thirty-day period. Seventy-four were admitted to hospitals; 16 lost the sight of one eye; many lost fingers; many were seriously burned. Two hundred and sixty-one physicians participated in the survey. Many additional cases were unreported.

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**A new Borden prescription product**, Gerilac Modified Milk, is being introduced to the medical profession and drug trade in the North Carolina area, it has been announced by Borden Company officials.

Gerilac is a spray-dried mixture of whole milk, skim milk, dried brewer's yeast fortified with riboflavin concentrate, vitamins A and D concentrate, irradiated ergosterol, ascorbic acid, niacinamide, monosodium phosphate and iron citrate. It has been tested clinically at several homes for the aged and gave significant results. Plain, the product has a pleasing taste, and variety may be enjoyed by the addition of flavors such as vanilla and chocolate. It may be served either as a beverage or used in cooking and baking.

Gerilac is sold in drug stores in one pound cans.

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**Three new products** are being introduced to doctors by the Winthrop Chemical Company, Inc., according to announcement made by J. G. Noh, vice-president and sales director. They are Digisidin, the principal glycoside of digitalis, known commonly as Digitoxin; Pluraxin, a therapeutic formula type of multi-vitamin product; and Pontocaine Neo-Synephrine 0.25 per cent solution, an anesthetic-vasoconstrictor for topical use.

Digisidin is supplied in tablets of 0.1 mg. (pink) and 0.2 mg. (white) in bottles of 50, 100 and 500.

The formula for Pluraxin is:

Vitamin A—25,000 U.S.P. units
Vitamin $B_1$—15 mg.
Vitamin $B_2$—10 mg.
Vitamin $B_6$— 2 mg.
Vitamin C—150 mg.
Vitamin $D_2$—1000 U.S.P. units
Calcium Pantothenate 10 mg.
Niacinamide 150 mg.

It is supplied in bottles of 30 capsules and 100 capsules.

Pontocaine Neo-Synephrine 0.25 per cent solution is supplied in 1-ounce and 8-ounce bottles.

For Shy, Nervous, Retarded Children

Year round private home and school for girls and boys of any age on pleasant 150 acre farm near Charlottesville.

Individual training and care, expert teachers. Limited enrollment, amusements, special diets, medical care if necessary. Entrance made at any time. Write for Booklet.

*Mrs. J. Bascom Thompson, Principal*

**THE THOMPSON HOMESTEAD SCHOOL**

**Free Union, Virginia**

NORTH CAROLINA MEDICAL JOURNAL

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VOLUME 8 APRIL, 1947 NUMBER 4

# WILLIAM ALLAN, M. D.

FREDERICK OSBORN, *Trustee,*
*Carnegie Corporation of New York*
NEW YORK

I knew Dr. Allan during a brief period in the latter part of his life. The inspiration which flowed from his character and from the quality of his thinking gave new purpose to my own work, as it did to all who knew him.

It was Dr. Allan's ambition to be a country doctor. He told me once that as a young man just out of medical school he picked Charlotte because he liked it and it seemed about his size. Charlotte was a village then; the grass grew in its streets, and it had a leisurely pace. In his lifetime it grew into a great city, and he, the country doctor, grew with it. His keen, restless mind led him, even in his earliest practice, to seek out causes. The healing of the sick was not enough, or often was not possible; and because he was deeply moved by suffering, he early began those studies which became in later life his deepest interest and brought him national recognition.

Born in Maryland on August 14, 1881, the son of Col. William Allan and Elizabeth Randolph Preston Allan, he attended Washington and Lee University at Lexington. In that atmosphere was confirmed the great tradition of the South in which he had been brought up. He attended the College of Physicians and Surgeons in Baltimore and graduated in 1906, starting his practice in Charlotte in 1908. Then came the war, during which he served in France with the rank of major. On his return he married Louisa Garnett Purcell. They had four children, and no one who ever was privileged to know that lovely family will forget how well they typified the best in American life.

Until nearly the end of his life Dr. Allan practiced medicine in Charlotte. He became professor of bacteriology and parasitology at the North Carolina Medical College in Charlotte, and later visiting professor of medicine at the Medical College of Virginia in Richmond. In all that time he never deserted that part of his private practice which took him out of Charlotte and up into the hills to the most remote and simple dwellings. It was not a very remunerative practice, financially; those people had little to pay him except their thanks. Their families were large; they were poor; they seldom moved from their neighborhood; many were interrelated. Dr. Allan had struck one of the few spots in the United States where hereditary disease could be located in quantity and adequately studied. Other doctors had worked in such communities without knowing the opportunity which lay at their door. Dr. Allan recognized it early, and from that time on the study of hereditary disease became the compelling interest of his life. He kept pedigrees of his mountain patients, visited their relatives in every part of the state to trace the incidence of their disease, found and recorded genetic defects, from harelip and the common diseases of the eye to the Greek tragedy of the muscular dystrophies.

He took up the study of genetics, and as his records became more extensive he began to make important contributions to the knowledge of human heredity. His publications in the medical journals attracted wide attention. He lectured before medical societies, first in his own state, and then in widening circles in all the big cities of the East. He was elected a director of the American Eugenics Society, and then its vice president; later he became a director of the

Association for Research in Human Heredity.

In some notes which were found among his unpublished papers after his death, he gave in brief summary the philosophy which he taught and felt so deeply. It is worth reading now as his final message:

> "The application of the knowledge of heredity in disease to a voluntary negative eugenics program is confined to a very small fraction of inherited diseases at the present time because little that is accurate or extensive is known about the great bulk of our hereditary diseases. It seems evident that the need for increasing our knowledge of the inheritance of disease is a much larger problem than the application of what we already know.
>
> "In order to have what little we know adopted and used by our health authorities and in order to get the medical profession to increase the knowledge of heredity in regard to disease, there are certain corollary problems which should also be tackled:
>
> "1. Enlisting the interest and cooperation of the present generation of doctors in the collection of pedigrees and the study of families under their care.
>
> "2. Teaching the next generation of doctors something about heredity in the Medical Schools by trying to interest medical teachers in the subject and convincing them that it is a necessary part of knowledge for physicians.
>
> "3. Pointing out to health officers that their activities do not touch a large proportion of all the causes of death and sickness at the present time.
>
> "4. Trying to interest them (health officers) in voluntary negative eugenics as a public health measure and in the study of hereditary diseases.
>
> "5. Some measure of public education as to the importance of heredity in relationship to health.
>
> "6. Some measure of education for prospective parents as to the likelihood of their having sound or defective children.
>
> "7. See that birth control stations run by County Health Departments all over the state are efficient."

In April, 1939, Dr. Allan received from the Carnegie Corporation of New York a grant for research in genetics which enabled him to take on an assistant, set his records in order, and enlarge his investigations. His health was already failing, but he continued his long and tiring trips in the field. His warm personality and his deep sympathy with all human suffering, together with his knowledge of the mountain people, gave him access to families and to information which would have remained unknown to others. He set up the "Family Record Office" in Charlotte. In 1941 the Wake Forest Medical School expanded to a four-year school under the name of the Bowman Gray School of Medicine. A department of medical genetics was set up in this new school, and Dr. Allan moved to Winston-Salem to take the chair of medical genetics. Assisted by further grants from the Carnegie Corporation, and with the help of a full-time geneticist under the direction of Lowell Reid of Johns Hopkins, he made rapid progress in tracing the genetic relationships of a great number of familial disorders. Then on April 24, 1943, in the midst of the most important phase of his work, Dr. Allan died. His going was a great loss to medical science. The work was far from complete, but it had gone far enough to give a new direction to medical thinking. It was the work of a pioneer and will stand always as an important landmark on the road of extension of knowledge.

Dr. Allan's fame rests on the unique contribution he made in a new field. But to all those who knew him the memory he leaves is of a simple, generous nature, a keen, humorous mind, a human warmth which touched all those about him, and a quiet dignity which sprang from the depths of a sincere and courageous spirit.

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by
## DR. WILLIAM ALLAN

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William Allan, M.D.

August 14, 1881 April 24, 1943

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# SPHEROCYTOSIS AND INCREASED ERYTHROCYTE FRAGILITY IN FOUR GENERATIONS OF THE FAMILY OF A PATIENT WITH CONGENITAL HEMOLYTIC ANEMIA

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Congenital hemolytic anemia (chronic acholuric jaundice) is an inherited disease characterized by microspherocytosis, increased erythrocyte fragility, and episodic bouts of hemolysis of the red blood cells with associated reticulocytosis, splenomegaly, jaundice, and bilirubinuria. The most characteristic feature of the disease is an inherited defect in the erythrocytes, which assume a spheroidal shape and are decreased in diameter. These microspherocytes, either in the serum of the patient or in serum of normal individuals, closely approximate the shape of normal cells about to burst in hypotonic saline solutions, and their resistance to hemolysis in hypotonic saline is less than that of normal cells.

Less has been published concerning hematologic studies in families of patients with congenital hemolytic anemia than concerning the individual case and its peculiarities(1), though several studies of families are to be found in the American literature(2). In some of these, however, histories rather than laboratory data sufficed to incriminate affected individuals. It was our good fortune to have available for laboratory studies 16 members of the family of a patient with proven congenital hemolytic anemia. Four generations and four complete sibships were represented. These 16 individuals were studied for the presence of spherocytosis, erythrocyte fragility, splenomegaly, and anemia.

## *Methods*

Red blood cell fragility was determined by placing the red cells, either citrated and washed or fresh, in serial dilutions of hypotonic saline varying from 0.70 to 0.32 per cent in gradients of 0.02 per cent. A control test on cells of a normal individual was run at the same time and under the same conditions—that is, with washed cells or fresh blood. Hemolysis was read after two and twenty-four hours.

Spherocytosis was determined by microscopic examination of both fresh, wet films and stained smears of the person's blood. The criterion was the demonstration of microcytic cells of increased thickness on wet preparations, and of a typical rouleau formation and microcytes well filled with hemoglobin on stained smears.

Splenomegaly was sought for by abdominal palpation alone, and anemia by routine red cell counts and hemoglobin determinations. The blood group (ABO) and blood type (MN) of each individual were determined by the usual methods, and the Rh factor was determined by the tube method, using $Rh_0$ antiserum.

The presence or absence of taste deficiency to phenyl-thio-carbamide (PTC) was determined in 12 members of the family. The taste test consisted of placing a few crystals of PTC on the tongue of the subject with a toothpick, and then recording his description of the taste experienced after about one minute. If a bitter taste was described, the test was recorded as positive and entered in the pedigree with the symbol "T." If the subject described a chalky or tasteless sensation, the test was regarded as negative (indicating taste deficiency), and was entered in the pedigree with the symbol "tt."

## *Case Report*

The propositus (the individual who brought the family to our attention) was a patient in the North Carolina Baptist Hospital, and is shown as individual IV-6 on the

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From the Department of Internal Medicine, Bowman Gray School of Medicine of Wake Forest College, and the North Carolina Baptist Hospital, Winston-Salem, North Carolina.

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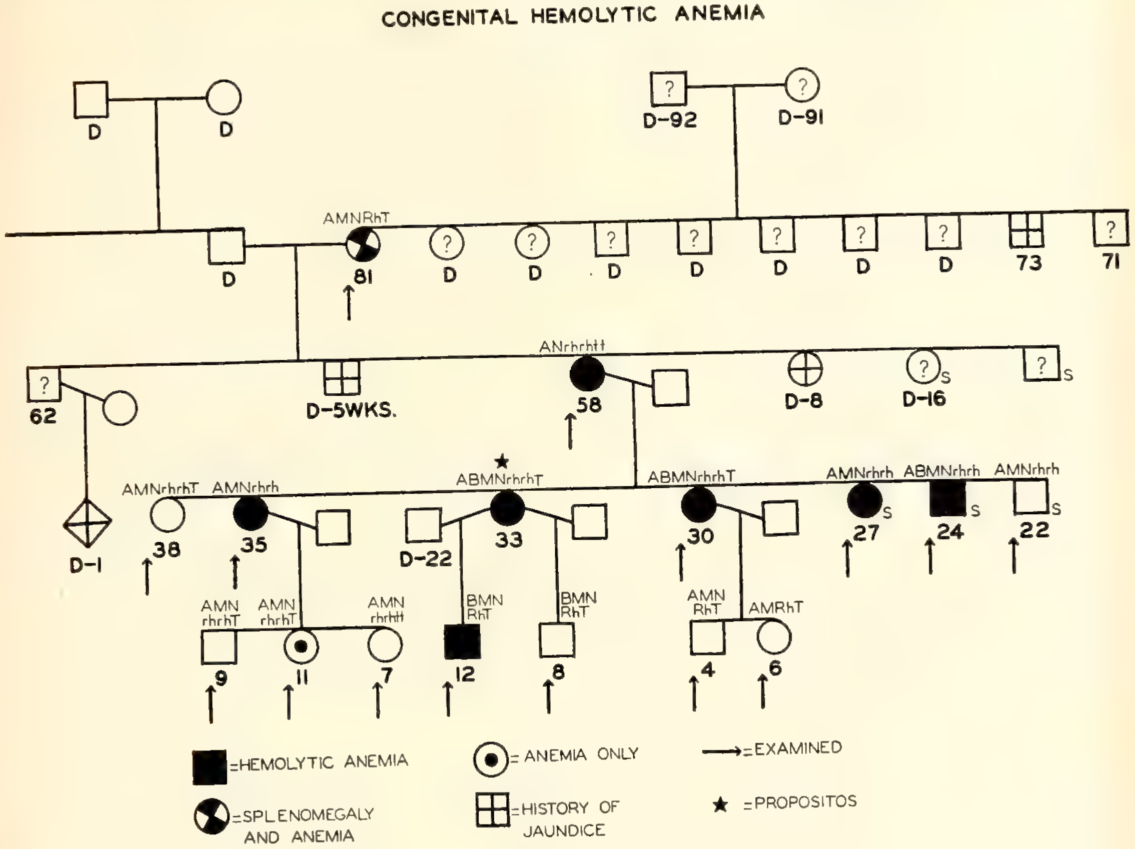

Fig. 1

pedigree chart(3) (figure 1). The clinical features of her case are summarized as follows:

A woman, aged 39, was admitted to this hospital complaining of "anemia and weakness" of eight months' duration. The illness was insidious in onset and was characterized by weakness, dyspnea on exertion, and a non-productive cough. The symptoms were gradually progressive, and in two months the patient was having orthopnea and dependent edema; jaundice developed at this time. She was admitted to another hospital, where she received penicillin and one transfusion; little benefit was obtained from this therapy, however. On strict bed rest the edema and dyspnea improved considerably, but the jaundice remained. The intensity of jaundice varied from time to time, and the weakness was related to the degree of jaundice.

On admission, the patient was decidedly jaundiced and presented the usual physical signs of rheumatic heart disease with mitral stenosis and insufficiency. The liver and spleen were both palpable about 8 cm. below the costal margins. The erythrocyte count was 1,600,000 and the hemoglobin 7.0 Gm. Spherocytosis was demonstrated on wet-film studies, and the erythrocyte fragility was found to be greatly increased. Hemolysis of the patient's cells began in 0.52 per cent saline and was complete in a 0.48 per cent solution; in the control, hemolysis began at 0.46 per cent and was complete at 0.38 per cent. The icterus index was 100 and the van den Bergh (indirect) 2.8 mg. per 100 cc.

X-ray of the chest revealed a rheumatic configuration of the heart, and the cholecystogram showed a non-functioning gallbladder with probable stone formation.

The patient was digitalized and was given transfusions of whole blood in preparation for surgery. A febrile and hemolytic reaction was experienced following the third transfusion. This transfusion reaction was attributed to Rh incompatibility. The patient was Rh-negative, and anti-Rh agglutinins were demonstrated in her serum following this reaction.

Splenectomy was performed on the twenty-sixth hospital day, under local anesthesia. The patient improved remarkably after operation, and by the twelfth postoperative day the erythrocyte count had risen to 3,000,000 and the hemoglobin to 11 Gm. On the eighteenth postoperative day a spiking fever developed, rising to 102 and 103 F. An abscess appeared at the lower angle of the abdominal wound. Penicillin (20,000 units every three hours) was begun promptly, and 20 cc. of pus was drained from the abscess on the twenty-first postoperative day; cultures of the evacuated pus showed Staphylococcus aureus. Transfusions of Rh-negative blood were also given. The infection proved to be fulminating

3. Individuals are located on the pedigree chart as follows: The Roman numeral refers to the generation, counting from above; the Arabic numeral refers to the position of the symbol on the row, counting from left to right. Thus, individual IV-6 is represented by the sixth symbol from the left in the fourth row of symbols from the top of the chart. Males are indicated by squares, females by circles, individuals of unknown sex by diamonds.

and resistant to therapy, however, and the patient expired on the twenty-second postoperative day. Permission for autopsy could not be obtained.

The final diagnoses were: (1) congenital hemolytic anemia, (2) rheumatic heart disease with congestive failure, and (3) septicemia.

### *Results of Studies*

The pedigree chart of the patient's family is shown in figure 1, and the result of examination of the relatives in table 1. Fifteen relatives who were also examined for increased cell fragility and spherocytosis are indicated by arrows on the pedigree chart. The seven individuals who were found to possess these traits are indicated by solid pedigree symbols. Only those individuals whose cells were completely hemolyzed in concentrations of saline at or above that in which initial hemolysis of control cells began were considered as having significantly increased erythrocyte fragility. In no instance did spherocytosis or increased fragility occur separately.

The patient's maternal grandmother was the only member of generation II who was examined. She failed to show evidence of spherocytosis or increased fragility, though marked anemia and moderate splenomegaly were present. One of her brothers was severely jaundiced at the age of 18, but recovered and is now living at the age of 73. This history was confirmed by personal communication, although he could not be obtained for hematologic examination.

Spherocytosis and increased fragility were demonstrable in the only member of the third generation who was examined. There was a history of jaundice in two of her siblings, one of whom died with jaundice at the age of 5 weeks.

The fourth generation consisted of the patient and her siblings. Five of 7 children possessed the defective red cells, but only one beside the patient had a history of jaundice. It should be emphasized that if *history alone* had been relied upon in classifying members of this sibship, only 2 would have been suspected of having congenital hemolytic anemia. The three other siblings who presented conclusive laboratory evidence of the presence of the disease were considered by close relatives and by themselves to be normal, healthy individuals.

The two sons of the patient were likewise reported to be normal, but one was found to have increased cell fragility and spherocytosis. The five other individuals in the fifth generation, all of whom were children of affected persons in the fourth generation, were examined and found to be normal.

Anemia was demonstrable in 7 members of the family (II-2, IV-3, IV-6, IV-8, IV-10, V-2, V-4). Five of these seven also presented spherocytosis and increased cell fragility. One (II-2) showed normal cell resistance to hypotonic saline and no evidence of spherocytes, but was found to have an enlarged spleen. One person (V-2) presented only anemia, the other studies being normal.

### *Discussion*

Congenital hemolytic anemia has long been recognized as a familial disease. The suggestion that the condition might be inherited as a simple dominant characteristic was first made by Plate(4) in 1913, and was confirmed by Meulengracht's investigation of seven families in 1921(5). Several similar studies have since appeared which support the concept of simple dominant transmission; the most extensive of these studies is probably that of Race(6).

The pedigree obtained in this family is in general agreement with the majority of those previously reported, and illustrates the transmission of a simple dominant gene. Definite evidence of direct transmission of the gene through three generations of the family was obtained, and highly suggestive evidence (anemia and splenomegaly) of the presence of the defect was found in the maternal grandmother (II-2) of the propositus.

This family illustrates the extremely variable clinical manifestations that can result from the presence of the gene, varying from extreme and prostrating illness terminating fatally in the propositus (IV-6) to apparently perfect health except for abnormal hematologic findings in her mother and some of her siblings. With such a wide range of clinical manifestations, history alone is not reliable in determining the presence or absence of the basic defect. If the history alone had been relied upon in this family, only one of the patient's 6 siblings would have been classed as affected, whereas hematologic examination revealed the presence of the defect in 4 of the 6 siblings and in the mother

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4. Plate, L. H.: Vererbungslehre, mit besonderer Beruecksichtigung des Menschen, Leipzig, W. Engelmann, 1913; quoted by Meulengracht(5).
5. Meulengracht, E.: Ueber die Erblichkeitsverhaltnisse beim chronischen hereditaren hamolytischen Ikterus, Deutsche Arch. f. klin. Med. 136:33-45 (April) 1921.
6. Race, R. R.: On the Inheritance and Linkage Relations of Acholuric Jaundice, Ann. Eugenics 11:365-384 (Dec.) 1942.

**Table 1**

| | | | | *Cell Fragility* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Individual* | *Hemoglobin (Gm.)* | *Red Cell Count (Millions)* | *Spherocytosis* | *Initial Hemolysis* | *Complete Hemolysis* | *Blood Group* | *Blood Type* | *Rh Factor* | *PTC Taste Test* | *Splenomegaly* |
| II-2 | 11.0 | 3.3 | — | 0.42% | 0.34% | A | MN | + | + | + |
| III-4 | 13.5 | 4.2 | + | 0.56 | 0.46 | A | N | — | — | — |
| IV-2 | 12.5 | 4.3 | — | 0.46 | 0.36 | A | MN | — | + | — |
| IV-3 | 10.5 | 3.9 | + | 0.56 | 0.48 | A | MN | — | ? | — |
| IV-6 | 6.5 | 1.4 | + | 0.52 | 0.48 | AB | MN | — | + | + |
| IV-8 | 12 | 4.4 | + | 0.52 | 0.42 | AB | MN | — | + | — |
| IV-10 | 11.0 | 3.8 | + | 0.48 | 0.42 | A | MN | — | ? | — |
| IV-11 | 11.2 | 3.9 | + | 0.50 | 0.44 | AB | MN | — | ? | — |
| IV-12 | 13.5 | 4.7 | — | 0.44 | 0.34 | A | MN | — | ? | — |
| V-1 | 12.0 | 4.4 | — | 0.42 | 0.34 | A | MN | — | + | — |
| V-2 | 11.0 | 3.9 | — | 0.46 | 0.36 | A | MN | — | + | — |
| V-3 | 13.0 | 4.8 | — | 0.40 | 0.34 | A | MN | — | — | — |
| V-4 | 12.0 | 3.8 | + | 0.54 | 0.46 | B | MN | + | + | — |
| V-5 | 13.5 | 4.3 | — | 0.48 | 0.38 | B | MN | + | + | — |
| V-6 | 13.0 | 4.7 | — | 0.44 | 0.34 | A | MN | + | + | — |
| V-7 | 12.5 | 4.2 | — | 0.46 | 0.36 | A | M | + | + | — |

of the propositus. It should also be emphasized that a history of jaundice should not be accepted as evidence of the disease until proper studies have demonstrated that the jaundice is the result of abnormal cell fragility. These considerations lead us to discount those reports in the literature in which conclusions concerning the presence or absence of disease in relatives of a patient are based on history alone.

Although the present family shows no evidence of reduction of penetrance of the gene(7), some evidence for such reduced penetrance has been presented by Race(6). In four of twenty-six families in which extensive hematologic studies were done, both parents of an affected individual were found to be normal. In one family, the normal father of a patient with congenital hemolytic anemia had 2 affected siblings and 4 normal siblings, indicating probable transmission of the mutant gene by an individual who showed no detectable sign of its presence. In the other three families described by Race, the abnormal individuals could conceivably represent the appearance of a new mutation, but other evidence of an extremely high mutation rate for this gene is lacking, and it seems likely that the gene has moderately reduced penetrance. Race's findings are in contrast to the statement of Debre and his coworkers(8) that "only diseased persons transmit the disease." It is apparent that these authors observed no evidence of reduced penetrance.

From this study we find no evidence to support the opinion given by Kracke(9) that the disease increases in virulence as it passes through succeeding generations. The affected son of the propositus in this family would have to be followed further, however, before this statement could be made with assurance. No definite evidence of increasing virulence is found in other reports in the literature. It would seem that Kracke's impression could have been gained from the extreme variability of the clinical picture, coupled with the fact that the most severely affected member of any family is the one most likely to come to the attention of the physician. One would then obtain a history of less severely affected relatives in preceding generations. If studies were made on several families, however, the more severe manifestations might be found to be distributed at random through several generations, or perhaps dependent upon environmental factors which are at present unrecognized.

This study and the reports in the literature give no evidence that the incidence of the disease in the two sexes is unequal. In this family 2 males and 5 females were af-

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7. The penetrance of a gene is the frequency, usually expressed as a percentage, with which it produces any clinically detectable effects when present. If every individual who possesses a given gene shows clinical evidence of the presence of that gene, then the gene is said to have 100 per cent penetrance. If the presence of the gene cannot be detected by examination in one person out of ten who has it, the penetrance is 90 per cent.

8. Debre, R., Lamy, M., See, G., and Schrameck, G.: Congenital and Familial Hemolytic Disease in Children, Am. J. Dis. Child. 56:1189-1214 (Dec.) 1938.

9. Kracke, R. R.: Diseases of the Blood, ed. 2, Philadelphia, J. B. Lippincott Co., 1941, p. 259.

fected. In Race's series, there were 37 affected males and 26 affected females. If this family is added to the above group, a sex ratio of 39 males to 31 females is obtained—a close approximation (chi square = 0.91) of the 1:1 ratio which would be expected on the assumption that a simple dominant gene is involved.

In the family here reported, the number of affected and normal members examined does not deviate significantly from the 1:1 ratio expected if a simple dominant gene is postulated. In the much larger series examined by Race the affected siblings of the propositi are significantly in the minority. Race attributes this fact to the high miscarriage and infant-mortality rates in the affected branches of these families, assuming that there would be a disproportionate number of affected individuals among the dead children. To a less extent, reduction of penetrance probably contributes to the excess of apparently normal siblings. As Race points out, the appearance that affected siblings are in the minority would be produced by including in the series cases of *acquired* hemolytic anemia. In the family here reported such an excess of normal individuals was not observed, the tendency being actually in the opposite direction. There was also no excess of miscarriages or deaths in infancy and childhood in the affected branches of this family.

Accessory test factors (blood group, blood type, Rh factor, PTC taste deficiency) were determined in the examined members of this family so that data might be available for testing for possible linkage between the hemolytic anemia gene and the above group of test genes, all of which are known to be on different chromosomes. Rh typings have not been previously reported on family groups with this condition. The only similar data previously available are those of Race. In his series, the following factors were tested: blood group, blood type, PTC taste deficiency, secretor factor of saliva, eye color, attachment of ear lobes, and sex. Race's calculations indicated that there was no evidence for linkage of the gene for hemolytic anemia with six of these factors, but the results for linkage with PTC taste deficiency were quite inconclusive, and little evidence either for or against linkage could be obtained. The figures in our own group are entirely too small to be of significance alone. If they are added to those previously reported by Race and his calculations are repeated, no significant change in the result appears by the addition of the new data. As sufficient data for accurate linkage computations with rare genes can be obtained only by pooling information from various investigations, the original data from this family are presented (table 1) without comment in the hope that additional similar observations will become available.

### *Summary*

1. The family of a patient with proven congenital hemolytic anemia is described. Fifteen relatives in four generations were examined, and detailed hematologic studies, consisting of determinations of the hemoglobin and red cell count; erythrocyte fragility tests, and wet-smear examinations for spherocytes, were performed on these individuals.

2. Among the 15 examined relatives, 6 presented laboratory evidence of the disease—namely, spherocytosis and increased erythrocyte fragility. One other individual was found to have anemia and splenomegaly without spherocytosis or increased erythrocyte fragility, and still another presented anemia alone.

3. A history of jaundice in childhood was obtained on 4 additional relatives who were not available for examination.

4. Among the 6 relatives presenting definite laboratory evidence of defective erythrocytes, only one gave a history of jaundice, and the remaining 5 were reported by history to be in good health.

5. Determinations were made of the blood groups, blood types and Rh factor in 16 members of the family, and of the taste reaction to phenyl-thio-carbamide in 12 members of the family. Although this series is too small to be of significance in linkage calculations, the data are presented in the hope that additional similar data may become available.

6. The findings in this family suggest that congenital hemolytic anemia is due to the action of a simple dominant gene, with variable expressivity. Evidence from the literature for some reduction in penetrance of this gene is presented.

7. We wish to emphasize the fact that history alone is entirely unreliable in classifying relatives of a patient with congenital

hemolytic anemia as normal or affected. The variability in the clinical picture is so great that accurate hematologic examination is necessary for proper classification of even apparently normal relatives.

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# AMEBIASIS

## *Case Reports from the North Carolina Baptist Hospital*

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*and*

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Because amebic dysentery is so prevalent in the tropics and semi-tropics, this disorder is usually considered as being rare in other areas. In view of this conception, it is interesting to recall that Endamoeba histolytica was first described as a cause of disease in man after Loesch had isolated the organisms from the stools of a patient having active dysentery, in St. Petersburg, Russia. Numerous surveys throughout the United States have shown that a high percentage of the population are carriers of amebic cysts, and reports from other clinics in this state have emphasized the fact that active amebiasis occurs more frequently than is generally realized(1).

### *Diagnosis*

The diagnosis of this disease presents little difficulty when patients enter complaining of bloody diarrhea. Proctoscopic examination reveals the typical ulcers, from which active amebae can be isolated by direct smear. In some cases, however, amebic infections produce bizarre clinical pictures, simulating chronic ulcerative colitis, primary tumor of the liver, lymphoma, and pyrexia of unknown origin. In such cases the diagnosis may be difficult.

### *Case Reports*

During 1945, 7 patients with amebiasis were seen at the North Carolina Baptist Hospital. These 7 cases serve to illustrate the protean clinical manifestations of this disease.

### *Uncomplicated amebic dysentery*

Cases 1 and 2 were so similar in history and findings that only one is being reported in detail.

A 24-year-old housewife entered the hospital complaining of diarrhea and generalized lower abdominal discomfort. These symptoms had begun suddenly four months previously and had persisted to the time of admission. She was having four to ten watery stools a day, containing mucus and small amounts of bright red blood. She had no fever or weight loss. Her appetite had remained excellent.

Physical examination was negative except for rather marked pallor, and tenderness in both lower quadrants. The urinalysis was negative. The hemoglobin was 60 per cent, the red cell count 3,250,000, the white cell count 5,350, with 58 per cent polymorphonuclear segmented forms, 9 per cent eosinophils, 30 per cent lymphocytes, and 3 per cent monocytes. The total serum proteins were 4.7 Gm. per 100 cc.

Proctoscopic examination revealed numerous punched-out, bleeding ulcers. Smears taken from these areas contained many motile Endamoebae histolytica.

*Comment*: This young woman presented the typical picture of amebic infection, with bloody diarrhea and weakness. She responded promptly to specific therapy, and during an eight months' period of follow-up no recurrence was noted. This patient had not been outside the state of North Carolina prior to the onset of her illness.

### *Amebic dysentery diagnosed as "chronic ulcerative colitis"*

Case 3: A 59-year-old man entered complaining of "stomach trouble and bleeding from the bowels" of fifteen months' duration. His previous health had been good. His symptoms began with pain high in the epigastrium, followed by the passage of ten to twelve greenish-black stools per day which contained blood and mucus. He had had no chills or fever at any time during his illness, but he had lost 8 pounds in weight. He was slightly nauseated but never vomited. He had seen various doctors, who gave him "dysentery medicine" and "shots" with little improvement. A barium enema examination was made and was interpreted as showing "ulcerative colitis."

The patient was a well developed, slightly undernourished male who did not appear ill. The abdomen was slightly distended, but there was no tenderness and no masses could be felt. Urinalysis was negative; the hemoglobin was 100 per cent, the red cell count was 4,000,000, and the white cell count 12,000, with 60 per cent polymorphonuclear segmented forms, 6 per cent non-segmented forms, 24 per cent lymphocytes, 4 per cent eosinophils, and 5 per cent monocytes. Proctoscopic examination revealed marked sphincter spasm and internal hemorrhoids. The lumen of the bowel was engorged and bleeding, and large, discrete areas of ulceration covered with whitish, necrotic exudate were noted. Microscopic examination of the material removed by smear showed innumerable motile amebae containing red blood cells.

Another proctoscopic examination made six days after the initiation of specific therapy revealed remarkable improvement in the bowel wall. Some ulcers were still present, but active amebae could no longer be demonstrated. Subsequent recovery was complete, and no recurrence was noted during

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1. Ruffin, J. M. and Schulze, W.: Amebic Dysentery as Seen in North Carolina, North Carolina M. J. 70:69-72 (Feb.) 1942.

the eighteen months that the patient was followed.

Case 4: This 23-year-old female was first admitted to the hospital with cramping pain in the right lower quadrant, nausea, and diarrhea. The diagnosis of acute appendicitis was made, and the appendix was removed and found to be acutely inflamed. Postoperatively severe diarrhea developed, accompanied by blood and mucus in the stools. The diarrhea gradually subsided, and she was discharged without proctoscopic examination.

Following her discharge she again began having bloody diarrhea; she lost approximately 45 pounds of weight, and became extremely weak. She was readmitted seven months later with a diagnosis of chronic ulcerative colitis and possible malignancy of the lower bowel. A biopsy specimen was taken from the rectum and was reported as showing "chronic colitis."

A medical consultation was obtained, and proctoscopy revealed large, necrotic, ulcerated areas with normal intervening mucosa. Active amebae were isolated by direct smear.

Specific treatment gave marked relief. At the end of ten days the patient was having one formed stool a day, without blood or mucus. Repeated proctoscopic examination revealed the mucosa to be entirely normal. The pathologic sections of the appendix were reviewed, but no amebae were noted.

*Comment*: Neither of these patients had been out of the state prior to infection. Both cases were diagnosed as ulcerative colitis before proctoscopic and stool examinations demonstrated their specific cause. An exacerbation of amebic dysentery like that noted in case 4 is not uncommon following operations.

### *Amebic hepatitis in which the presenting symptom is pyrexia of unknown origin*

Case 5. A 16-year-old schoolboy was admitted to the hospital with the history of an upper respiratory infection followed in three weeks by aching beneath the left shoulder blade which was made worse on inspiration. One week later, he began to have back pain, aching in all joints, tenderness of the muscles, high fever, and profuse sweats. A transient rash appeared on the lower abdomen and shoulders several days before admission. He gave no history of having been bitten by an animal or insect.

His temperature on admission was 105.5 F. He was well developed and well nourished, and appeared surprisingly well despite his fever. The skin was flushed, and circumoral pallor was noted. The posterior cervical and axillary nodes were enlarged but non-tender. The heart and lungs were normal. The abdomen was slightly distended, but was not tender. The liver edge was palpable just below the right costal margin. Fist percussion over the liver gave no pain.

Urinalysis, including dark-field examination for spirochetes, was negative. The hemoglobin was 88 per cent, the red cell count 5,400,000, the white cell count 11,050, with 70 per cent segmented polymorphonuclears, 6 per cent non-segmented forms, 6 per cent eosinophils, 1 per cent basophils, 16 per cent lymphocytes, and 1 per cent monocytes. The patient had no diarrhea. Repeated stool examinations by direct smear and concentration were negative for ova, parasites, and occult blood. Blood cultures and smears for malaria were negative on several occasions, as were Wassermann tests of the blood and spinal fluid. Agglutinations for typhoid, paratyphoid, brucella, and Proteus $X_{19}$ were also negative. Biopsy of a lymph node was reported as showing "hyperplastic lymphadenitis."

The patient's temperature rose as high as 104 to 106 F. each evening. At no time did he feel bad or have specific complaints. Antipyretics, alcohol sponges, and ice packs were used in an effort to control his fever. Neoarsphenamine and quinine were given empirically without producing any change.

On the seventeenth hospital day slight tenderness to fist percussion developed over the liver area, and it was decided to give a therapeutic trial of emetine hydrochloride. The temperature was 106.2 F. when emetine was started. It immediately fell to normal, where it remained for the next eight days, when it again spiked to 105 F. on one occasion. After this the patient was afebrile during the remainder of the hospital stay. He felt markedly improved, gained weight, and became completely asymptomatic. Follow-up studies over a three-month period have shown no recurrence of symptoms.

*Comment*: This case illustrates the occurrence of amebic hepatitis without a previous history of diarrhea or gastro-intestinal complaints. The condition may have been precipitated by the preceding upper respiratory infection. Where increasing hepatomegaly is accompanied by fever, chills, and tenderness in the right upper quadrant, a trial of emetine is indicated.

### *Amebic abscess simulating a tumor of the liver*

Case 6. A 38-year-old man entered the hospital with the complaints of weakness, fever, and backache of four months' duration. He had received penicillin for six days at another hospital with some improvement, but seven weeks later his symptoms recurred. He had had no pain or cough, and had not noted any masses. There was no nausea, vomiting, diarrhea, or other localizing symptoms. His appetite was poor, and he had lost approximately 20 pounds in weight.

Physical examination revealed a pale man appearing chronically ill and showing evidence of weight loss. The inguinal nodes were enlarged but not tender. In the right upper quadrant there was a lobulated, non-tender mass which moved with respiration and appeared to be in the right lobe of the liver. It measured about 10 cm. in diameter. Fist percussion elicited no tenderness over the kidneys or liver. The diaphragm descended well.

Urinalysis was negative; the hemoglobin was 80 per cent, the red cell count 3,900,000, the white cell count 12,300. Stool examination revealed no ova or cysts. Blood cultures and biopsy of an inguinal lymph node were reported negative. A chest plate and film of the abdomen revealed a soft-tissue mass in the right upper quadrant of the abdomen which appeared to displace downward the hepatic flexure and the proximal half of the transverse colon. Thoratrast studies revealed enlargement of the liver, both downward and to the left, and a localized area of diminished concentration overlying the lower portion of the right lobe of the liver. The nature of this lesion was uncertain, but the radiologist felt that it probably represented a lesion within the liver—possibly a primary tumor, cyst, or liver abscess.

The patient's temperature rose daily to 103 F.

Repeated search for amebae by direct examination of stools and of material obtained from proctoscopy was negative. A therapeutic trial of emetine was begun, and within twenty-four hours the temperature dropped to 99.2 F., and the patient began to improve. On the eleventh day of emetine therapy, however, the temperature again rose to 100.8 F. The patient was discharged with a tentative diagnosis of tumor of the liver.

He was kept under close observation, and twenty-one days later was readmitted with a recurrence of all his symptoms. Exploratory laparotomy was performed, and an abscess of the inferior surface of the right lobe of the liver was aspirated, and then incised and drained. A self-retaining mushroom catheter was inserted and was brought out through the flank. Biopsy of material removed from the liver showed amebae in the abscess wall.

One month later the cavity had decreased to about 3 cm. in size; the catheter was withdrawn and the patient discharged. Re-examination at the end of four months showed marked improvement and weight gain. The patient is now well.

*Comment*: Amebic liver abscess may simulate other hepatic infections or tumor of the liver. From the history, the abscess was present in this case for five months before the diagnosis was made and drainage was performed. Transient improvement with emetine may occur in such cases, but large abscesses require surgical drainage in addition to a continuation of specific therapy following surgery.

### *Amebic dysentery occurring concomitantly with malaria in a returning war veteran*

**Case 7.** A 23-year-old ex-soldier who had been stationed in the South Pacific area for five years was in good health until three months before admission. At that time, while in the Philippines, he began to have mild diarrhea without mucus, blood, or abdominal pain seven days after eating native food. Nine days later griping pain developed in the lower part of the abdomen, usually coming on after meals. He began having eight to ten loose stools daily, containing gross blood and large quantities of mucus. He had no fever or chills, and his appetite remained good, although he lost between 40 and 50 pounds in weight. His stools were examined and reported as negative. His dysentery persisted until the time of his admission to this hospital, however.

On physical examination the skin was found to be discolored by atabrine, and tenderness was noted in both lower quadrants of the abdomen. The laboratory findings were within normal limits. Proctoscopic examination revealed numerous punched-out ulcers from which motile Endamoebae histolytica were obtained.

The patient responded promptly to treatment, but on the tenth hospital day his temperature spiked to 101 F., and the following day to 104 F. Emetine was begun, but he had another chill twenty-four hours later, at which time parasites of benign tertian malaria were demonstrated in the peripheral blood. The emetine was discontinued, and a course of quinine and atabrine was given. He rapidly became asymptomatic and was discharged. Follow-up examination in three months showed no recurrence of either amebiasis or malaria.

*Comment*: This case represents an interesting combination of parasitic diseases, a problem which all practitioners will have to bear in mind during the period of demobilization of the armed forces. Malaria and amebiasis may aggravate each other, and a recurrence of one may precipitate an exacerbation of the other.

## *Treatment*

In patients with active dysentery, the administration of 0.25 Gm. of carbarsone orally three times a day for ten days and 5 Gm. of yatren as a retention enema each night is highly effective. In cases where the complication of hepatitis or liver abscess is present, emetine, 0.032 Gm. twice daily for ten days, is indicated. If the abscess is large, surgical drainage may also be necessary.

## *Summary and Conclusions*

That amebic infections are not uncommon in North Carolina is indicated by the fact that 7 cases were seen in the North Carolina Baptist Hospital during 1945. Six of these cases are reported in detail, and the variations in the clinical pictures are described. The average duration of the disease before the correct diagnosis was made was six months. In each instance specific treatment for amebiasis resulted in a prompt and satisfactory response. Follow-up examinations in each case have shown no recurrences to date.

Amebiasis should be suspected in all patients having bloody diarrhea or tenderness in the right upper quadrant accompanied by fever and hepatomegaly. Proctoscopic examination and direct smears of any ulcers seen are the most important aids in the diagnosis of amebic dysentery.

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**Nervousness is not necessarily a term of opprobrium.** It can be taken as a compliment. Most people who have done big things in the arts and sciences have been nervous and neurotic. They had to be to sense things as keenly as they did. And if a woman is to have any vivacity and social charm she must be nervous and highly sensitive. Without these qualities she cannot be wide-awake and responsive and interested in people and in everything that is going on about her; without it her face will not be mobile and attractive, her eyes will not light up, and her conversation will not be animated. But it is just this ability to feel keenly and react strongly that commonly brings in its train fatigue and suffering.—Alvarez, Walter C.: Nervousness, Indigestion, and Pain, New York, Paul B. Hoeber, Inc., 1943, p. 129.

# PEPTIC ULCER OF THE DUODENUM

## *A Review of Ninety-Eight Cases Treated Surgically*

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This critical review of a group of surgically treated duodenal ulcers will expose many problems that are faced in attempting to get best results in the disease, and will at the same time permit a summary of observations of value even if no definite conclusions can be drawn. Gastric ulcers are not considered in this discussion, primarily because of the great dissimilarity between duodenal and gastric ulcers. The latter are characterized by a frequent predisposition to malignancy, while the former tend to be benign and chronic.

The cases herein reported have been treated by a number of visiting surgeons and by members of the resident staff of the North Carolina Baptist Hospital during the years 1941 to 1946 inclusive(1). There have been, therefore, not only many different operations done, but many small variations in technique in the same types of operations.

### *Causative Factors*

Predisposing etiologic factors in the production of peptic ulcers are numerous and are well recognized. Age, sex, occupation, and season are considered among the most significant of these factors, and they were found to be important in this group. Ivy(2) recently pointed out that 90 per cent of ulcers are diagnosed in patients over 20. Table 1 shows that 96.9 per cent of the patients coming to surgery here were beyond the age of 20, and that 72.5 per cent were between 30 and 59 at the time of operation. The youngest patient was 14 years of age.

Recent reports concerning the sex incidence of ulcers have shown remarkable agreement. Jennison(3) reported a male-to-female ratio of 5.5:1; Emery and Monroe(4), and Eusterman and Balfour(5) reported a ratio of 4:1; and Anderson, Allen and Packard(6) a ratio of 6:1. In this series (table 1) there were 81 males and 17 females—a ratio of 4.7:1. The fact that the sex distribution in these patients coming to surgery corresponds so closely to that in the medically treated cases mentioned above suggests that sex makes no difference in the response of duodenal ulcer to medical treatment.

**Table 1**

**Age and Sex of Patients**

| **Age** | **No.** | **Per Cent** |
|---|---|---|
| 10-19 years | 3 | 3.1 |
| 20-29 years | 12 | 12.2 |
| 30-39 years | 29 | 29.6 |
| 40-49 years | 23 | 23.5 |
| 50-59 years | 19 | 19.4 |
| 60-69 years | 10 | 10.2 |
| 70-79 years | 2 | 2.0 |
| **Total** | **98** | **100** |
| **Sex** | **No.** | **Per Cent** |
| Males | 81 | 82.7 |
| Females | 17 | 17.3 |
| **Total** | **98** | **100** |

Occupation has been thought to be of importance as a predisposing etiologic factor. Some writers, finding a higher incidence of ulcer in individuals occupied in some particular work, have attempted to explain that fact by saying that the psychic demands made on that group may have been responsible for the development of ulcer. It is probable that the emotional state plays an important role in this disease, and that occupation has its effect indirectly by producing anxiety, stress, frustration, and other dysphoric states. Udaondo and Nasio(7) found that peptic ulcers were more common among professional people, and particularly among public officials. The incidence among professional people in this series, however, was very low, and—in contrast to the low incidence found by Udaondo and Nasio among people engaged in manual labor—the highest incidence was in farmers, who made up

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1. We wish to express appreciation to Drs. A. de Talma Valk, William H. Sprunt, James F. Marshall, Howard M. Starling, Philip B. Hardymon, and James F. O'Neill, who permitted the inclusion of their cases in this review.
2. Ivy, A. C.: The Problem of Peptic Ulcer, J.A.M.A. 132: 1053-1059 (Dec. 28) 1946.
3. Jennison, J.: Observations Made on Group of Employees with Duodenal Ulcer, Am. J. M. Sc. 196:654-662 (Nov.) 1938
4. Emery, E. S., Jr., and Monroe. R. T.: Peptic Ulcer: Nature and Treatment Based on Study of 1,435 Cases, Arch. Int. Med. 55:271-292 (Feb.) 1935.
5. Eusterman, G. B., and Balfour, D. C.: The Stomach and Duodenum, Philadelphia, W. B. Saunders Company, 1936.
6. Anderson, R. H., Allen, G. L., and Packard, G. B.: Factors Influencing the Prognosis in Acute Perforated Peptic Ulcer Based on a Review of 59 Consecutive Cases at the Colorado General Hospital, Rocky Mountain M. J. 42:661-665 (Sept.) 1945.
7. Udaondo, C. B. and Nasio, J.: The Incidence of Gastric and Duodenal Ulcer in Different Professions and Occupations. (Incidencia de la ulcera gastrica y duodenal en las profesiones y oficios), Prensa med. argent., 32:1581-1594 (Aug. 17) 1945.

about 20 per cent of the total group. Housewives formed the second largest group (12 per cent), with textile workers running a close third (10 per cent). The remaining 58 per cent was made up of thirty-two other classes of workers, many of whom were engaged in physical labor. Perhaps we should not too readily accept the theory that a causal relationship exists between occupation or social stress and peptic ulcer, since it is not yet scientifically proved. We are inclined to believe that occupation and psychosomatic factors are very closely related in the production of ulcer.

The final predisposing factor which we investigated was the seasonal occurrence of the lesions. The tendency for ulcers to recur or be reactivated in the spring and fall is generally recognized, but its significance is unknown. Ivy(2) pointed out that "Little by way of satisfactory clinical data has been offered in support of this impression." He commented that the seasonal variation in the incidence of peptic ulcer must have some etiologic significance. Among these 98 patients only 38 (38.8 per cent) gave a definite history of seasonal occurrence or exacerbations. In 14 cases the record failed to mention whether there was or was not any seasonal variation. Thirty-four patients reported no definite periodicity to their symptoms, and 11 patients stated that their pain was constant.

### *Previous Treatment*

Adequate medical care of patients with duodenal ulcer is difficult to define, and even if it were well defined and outlined it would be difficult to follow. In general, adherence to some type of bland diet with intermediate feedings, systematic use of antacids, and abstinence from the use of tobacco and alcohol were considered minimal criteria for adequate medical care in these cases. As is seen in table 2, only 27 (27.5 per cent) of the 98 patients had what we considered adequate medical care.

**Table 2**

**Adequacy of Medical Care Prior to Surgery**

| | No. | Per Cent |
|---|---|---|
| Adequate | 27 | 27.5 |
| Inadequate | 71 | 72.5 |

This failure of the medical regimen even in these 27 patients is not surprising when one reviews the many reports in the literature on refractory peptic ulcers. Out of 151 patients treated medically in the Rigshospital in Copenhagen, 71 per cent had a recurrence of symptoms within one year and 87 per cent within two years(8); nothing was said regarding the type of after-care the patients followed. Crohn(9) found that "five-year cures" occurred in about 40 per cent, and "ten-year cures" in less than 30 per cent of medically treated patients. Emery and Monroe(4), reporting on 1,085 patients treated medically by a "complete Sippy treatment" for nine to twelve months, followed by a "partial Sippy" and then by "five meals and alkaline powders," revealed that only 21.4 per cent were entirely free of symptoms at the end of one year and 16.3 per cent at the end of two years. St. John and Flood(10), in a more recent study, found that 65 per cent of 140 patients followed for two years suffered recurrences. That high recurrence rate was in patients treated with bed rest in a hospital for eighteen days on a "modified progressive Sippy regime," followed by six feedings a day and alkaline powders when necessary. Raimondi and Collen(11) stated that "the high incidence of recurrences (in 83 per cent of patients treated for two years) indicates the chief therapeutic problem in the management of peptic ulcer is the prevention of exacerbations."

**Table 3**

**Duration of Symptoms (Patients with Acute Perforations Not Included)**

| | No. | Per Cent |
|---|---|---|
| Under 1 year | 3 | 3.7 |
| 1- 5 years | 19 | 23.5 |
| 6-10 years | 25 | 30.8 |
| 11-15 years | 13 | 16.0 |
| 16-20 years | 10 | 12.4 |
| 21-25 years | 5 | 6.2 |
| 26-30 years | 6 | 7.4 |
| Total | 81 | 100 |

In 81 of our 98 patients the duration of symptoms was investigated (table 3). The 17 patients with acute perforations were not included in this study. In only 3 cases (3.7 per cent) were the symptoms of less than one year's duration. In 72.8 per cent of the patients the symptoms had been present for more than five years.

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8. Nielsen, N. A.: Results of Medical Treatment of Gastric and Duodenal Ulcer. Acta med. Scandinav. 58:1-42, 1923.
9. Crohn, B. B.: Recurrences in Peptic Ulcer, in the Frank Howard Lahey Birthday Volume, Springfield, Illinois: Charles C. Thomas, 1940, pp. 137-144.
10. St. John, F. B., and Flood, C. A.: Study of Results of Medical Treatment of Duodenal Ulcer, Ann. Surg. 110:37-49 (July) 1939.
11. Raimondi, P. J., and Collen, M. F.: Recurrence Rate of Symptoms in Peptic Ulcer Patients on Conservative Medical Treatment, Gastroenterology 6:176-181 (March) 1946.

**Table 4**

**Indications for Surgery in 107 Operations***

| | No. | Per Cent |
|---|---|---|
| Intractable pain | 40 | 26.7 |
| Obstruction | 36 | 24.0 |
| Hemorrhage | 32 | 21.3 |
| Acute perforation | 18 | 12.0 |
| Previous perforation (One or more) | 11 | 7.3 |
| Marginal ulcer | 7 | 4.7 |
| Possible malignancy | 2 | 1.3 |
| Cholelithiasis | 2 | 1.3 |
| Obstruction of old gastroenterostomy | 1 | .7 |
| Gastro-entero-colic fistula | 1 | .7 |
| **Total** | 150 | 100 |

* Since indications for operation were multiple in some individuals, the total number of indications in the 98 patients is 150.

### *Indications for Surgery*

The indications for operation are shown in table 4. The four manifestations of duodenal ulcer requiring surgical relief most often were (1) intractable pain (26.7 per cent), (2) obstruction (24 per cent), (3) hemorrhage (21.3 per cent), and (4) acute perforation (12 per cent). These indications for operation comprise 84 per cent of the total, and the addition of previous perforations (7.3 per cent) raises the figure to 91.3 per cent. Marginal ulcers in old gastroenterostomies occurred in 7 patients (4.7 per cent). Suspicion of malignancy was the indication for surgery in 2 patients (1.3 per cent); fortunately, their lesions proved to be benign duodenal ulcers rather than carcinoma of the pyloric channel of the stomach. In 2 other patients cholelithiasis was the condition which prompted the surgeon to do a celiotomy; apparently the existing ulcer had not been diagnosed preoperatively, but in both cases the ulcer was attacked successfully. One patient with obstruction of an old gastroenterostomy required surgery for relief, and 1 patient was operated upon for a gastro-entero-colic fistula.

### *Intractable pain*

"Intractable pain" is a term used rather loosely by recent writers "to include some patients who, with a better economic or intellectual status, might well have continued on conservative measures."(12) We are in agreement with the above statement and are beginning to advise surgery more often for that group of patients who have recurrence of symptoms because they are unable to earn a livelihood while treating their ulcers medically. Hinton(13) has considered intractable pain the most valid reason for subjecting a patient with duodenal ulcer to surgery. Findings in this group of patients support that opinion, for unrelieved pain was the indication most frequently responsible for operation in these cases.

### *Obstruction*

Obstruction was the second most common indication for surgery, occurring in 24 per cent of the patients in this study. The generally accepted criterion for operating upon this group is constriction due to scar tissue and not relieved by decompression, or edematous obstruction which is recurrent and is due to repeated ulcer activity. Patients with cicatricial stenosis give a history of insidious onset and usually a long history of ulcer symptoms. In those with edematous obstruction, the onset is usually rapid and the obstructive symptoms are often coincident with an obvious return of activity in the ulcer. The immediate results from relatively conservative surgical procedures such as gastroenterostomy or pyloroplasty have been good in this group of patients, and especially so in the older individuals. It is likely that patients in later life have obstruction due to scar tissue more commonly than obstruction from the edema of an acute ulcer. They should be expected to respond better to surgery, since they often exhibit low acid values in the gastric juice.

Allen(14) in 1942 reported 3 cases of jejunal ulcer following posterior gastroenterostomy for cicatricial obstruction, 2 of them occurring in elderly men who had obtained relief from gastroenterostomy for several years. He stated that if palliative operations are done for obstruction, one must be prepared for failure. He performed a subtotal gastrectomy on several patients with cicatricial obstruction subsequent to duodenal ulcer, and was agreeably surprised to find that the lack of acute inflammation and the enlarged stomach enhanced the safety of the procedure. It is his belief that more radical measures than some short-circuit or pyloroplasty type of operation must be taken in patients with cicatricial obstruction, but that conservative therapy is indicated for tem-

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12. Allen, A. W., and Welch, C. E.: Subtotal Gastrectomy for Duodenal Ulcer, Ann. Surg. 124:688-707 (Oct.) 1946.

13. Hinton, J. W.: Intractable Duodenal Ulcer: Evaluation of Surgical Procedures, Ann. Surg. 117:498-511 (April) 1943.

14. Allen, A. W.: Subtotal Gastrectomy for Stenosing Duodenal Ulcer, J.A.M.A. 120:493-497 (Oct. 17) 1942.

porary edematous obstruction occurring during acute exacerbations(12).

### *Hemorrhage*

In 21.4 per cent of our patients operation was indicated because of hemorrhage. Repeated massive loss of blood had occurred in many patients, but none of them were operated upon within the first seventy-two hours. Most authors are agreed that about 25 per cent of patients with duodenal ulcer are subject to hemorrhage. Hemorrhage in patients beyond 50 years of age is apt to be massive in about half the cases, and in this age group the mortality from conservative treatment of massive hemorrhage is about 33 per cent(15). Hart and Shingleton(16) recently reported a mortality of 1.5 per cent in patients treated medically for hemorrhage, and 9 per cent in patients referred for surgery after medical treatment had failed.

### *Perforation*

The fourth most common indication for surgery in these patients was acute perforation (12 per cent). It is generally agreed that surgical closure of the perforation is necessary when this complication arises. It has been pointed out, however, that when these patients are treated by intragastric suction very little of the gastroduodenal content is spilled into the peritoneal cavity, and that spontaneous sealing-off of the ulcer might occasionally occur(17).

In 11 (7.3 per cent) of these cases previous perforations of the ulcers had occurred. This history of perforation one or more times in the past was commonly associated with recurrent bouts of pain or obstruction, or both.

Estes and Bennett(18) analyzed the end results following operation in 80 consecutive cases of acute perforated gastroduodenal ulcers, and reported that 22.8 per cent required further surgery or hospitalization; reperforation occurred in 12.7 per cent of their patients. Houston(19) reported that 26 (65 per cent) of 40 patients with ruptured duodenal ulcers had symptoms after recovery. Twelve of the 26 required further operations; 3 had subsequent perforations, and 9 came to surgery because of obstruction.

### *Types of Operations and Mortality*

Table 5 shows the types of operations performed and the mortality from each type.

**Table 5**

**Types of Operations and Mortality**

| | *No. Cases* | *Deaths* *No.* | *Deaths* *Per Cent* |
|---|---|---|---|
| Subtotal gastrectomy (Polya–3; Hofmeister–50) | 53 | 2 | 3.7 |
| Closure of perforation | 17 | 3 | 17.6 |
| Transthoracic vagotomy | 8 | 1 | 12.5 |
| Posterior gastroenterostomy | 19 | 0 | 0 |
| Resection of gastroenterostomy and subtotal gastrectomy | 2 | 1 | 50.0 |
| Pylorectomy | 3 | 0 | 0 |
| Finney pyloroplasty | 1 | 0 | 0 |
| Resection of gastro-entero-colic fistula | 1 | 0 | 0 |
| Anterior gastroenterostomy and jejuno-jejunostomy | 1 | 0 | 0 |
| Excision of duodenal diverticulum | 1 | 0 | 0 |
| Cecostomy | 1 | 0 | 0 |
| **Total** | **107** | **7** | **6.5** |

### *Subtotal gastrectomy*

Subtotal gastrectomy was done in 53 patients, with 2 deaths. Fifty of these operations were done by the Hofmeister technique and 3 were of the Polya type. The uncorrected operative mortality rate is 3.7 per cent. Reinhoff(20) reported a mortality of 2 per cent in 260 resections. McKittrick, Moore, and Warren(21) reported a mortality of 3.7 per cent in 320 primary elective subtotal resections of the stomach. For duodenal ulcers alone the mortality rate was 8.1 per cent from 1936 through 1941; in 1942 and 1943 there were no deaths following 94 resections for duodenal ulcer. In 1946 Allen and Welch(12) reported an operative mortality of 2.6 per cent in 190 elective resections.

### *Closure of perforations*

The second type of operation shown in table 5 is closure of perforated duodenal ulcers. Seventeen perforations were treated

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15. (a) Allen, A. W., and Benedict, E. B.: Acute Massive Hemorrhage from Duodenal Ulcer, Ann. Surg. 98: 736-749 (Oct.) 1933.
    (b) Bohrer, J. V.: Massive Gastric Hemorrhage, With Special Reference to Peptic Ulcer, Ann. Surg. 114:510-525 (Oct.) 1941.
    (c) Westermann, J. J.: Surgical Aspects of Bleeding Gastric and Duodenal Ulcer, Ann. Surg. 101:1377-1388 (June) 1935.
16. Hart, Deryl, and Shingleton, W. W.: The Treatment of Peptic Ulcer With Special Reference to Acute Massive Hemorrhage, North Carolina M. J. 8:67-72 (Feb.) 1947.
17. Ulfelder, H. and Allen, A. W.: Acute Perforation of Ulcers of the Stomach and Duodenum, New England J. Med. 227:780-784 (Nov. 19) 1942.
18. Estes, W. L., Jr. and Bennett, B. A., Jr.: Acute Perforation in Gastroduodenal Ulceration, with Special Reference to End-Results, Ann. Surg. 119:321-341 (March) 1944.
19. Houston, W.: The Aftermath of Perforated Peptic Ulcer, Brit. M. J. 2:221-223 (Aug. 17) 1946.
20. Rienhoff, W. F., Jr.: An Analysis of the Results of the Surgical Treatment of 260 Consecutive Cases of Chronic Peptic Ulcer of the Duodenum, Ann. Surg. 121:583-599 (May) 1945.
21. McKittrick, L. S., Moore, F. D., and Warren, R.: Complications and Mortality in Subtotal Gastrectomy for Duodenal Ulcer, Ann. Surg. 120:531-561 (Oct.) 1944.

by simple closure and suture of a tag of omentum over the ulcer site. There were three deaths following these operations—a mortality rate of 17.6 per cent. The recorded death rates for perforated ulcers range between 3.2 per cent and 25.43 per cent, the average being around 20 per cent(18). Olson and Norgore(22) recently reported an over-all mortality of 27.7 per cent in patients with perforated ulcers; some of their parents died from unrelated causes, however.

### *Vagus resection*

Transthoracic resection of the vagus nerves was the surgical procedure selected for 8 of these patients. Unfortunately the first patient died as a result of a totally unrelated condition, giving a mortality of 12.5 per cent. The cause of this patient's death was learned at the autopsy table after several stormy postoperative days. Preoperatively he had a large, easily reducible indirect inguinal hernia on the left. Following operation abdominal distention was marked, and large quantities of fluid were aspirated from the stomach through a nasal tube. It was thought that these findings represented extreme postvagotomy ileus and gastric dilatation. Postmortem examination, however, revealed a small Richter's hernia at the internal inguinal ring, with perforation of the ileum and generalized peritonitis.

Much has been written recently concerning vagotomy for peptic ulcer. Anatomic studies with careful dissections of the vagus nerves in the lower chest and upper abdomen have been performed(23). Dragstedt(24) and others have adequately discussed the physiologic basis for the operation.

### *Gastroenterostomy*

The only other type of operation done in an appreciable number of these patients is gastroenterostomy. In 19 cases there have been no deaths. Most of these shunting procedures were done for obstruction in the duodenum. Although these patients recovered from the operation and usually had at least temporary improvement in their symptoms, the procedure has not been popular with us. Too many of the patients have had recurrence of symptoms. Now that vagotomy is giving such satisfactory immediate relief from symptoms of ulcer, it is possible that gastroenterostomy combined with resection of the vague nerves may become very popular in the management of obstructive duodenal ulcers and scars.

### *Other operative procedures*

The only other death was in one of the 2 patients having a marginal ulcer which necessitated a resection of the gastroenterostomy and a subtotal gastrectomy. This patient had thrombocytopenic purpura and bled from the abdominal wound and from the gastrojejunal anastomosis.

Three patients had pylorectomies. One patient had a pyloroplasty, one had resection of a duodenal diverticulum, and one had an anterior gastro-enterostomy with jejunojejunostomy. In one instance a cecostomy was done preliminary to the resection of a gastroenterocolic fistula. There were no deaths in these cases.

## *Non-Fatal Complications*

### *Following gastrectomy*

In the 51 patients who recovered following subtotal gastrectomy, the morbidity rate was relatively low (table 6). Three patients had wound disruption and one had a wound infection—a total of 4 cases (7.8 per cent) with wound complications. Two patients (3.9 per cent) developed pneumonitis. Partial obstruction of the stoma occurred in 1 patient (1.9 per cent), but it subsided in a few days. In 2 patients (3.9 per cent) the complications were totally unrelated to their diseases: Cardiac decompensation developed in one, but the patient made a rapid recovery from it; the other patient had atelectasis, pneumonia, and decubitus ulcer, and he also finally recovered. One complication

**Table 6**

**Complications in 51 Patients Who Recovered Following Subtotal Gastrectomy**

| | *No. Cases* | *Per Cent* |
|---|---|---|
| Wound disruption | 3 | 5.9 |
| Wound infection | 1 | 1.9 |
| Pneumonitis | 2 | 3.9 |
| Partial obstruction of stoma | 1 | 1.9 |
| Cardiac decompensation | 1 | 1.9 |
| Atelectasis, pneumonia, and decubitus ulcer | 1 | 1.9 |
| Saddle anesthesia; neurogenic paresis of the bowel and bladder | 1 | 1.9 |
| Ligation of common bile duct | 1 | 1.9 |
| **Total** | 11 | 21.6 |

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22. Olson, H. B. and Norgore, M.: Perforated Gastroduodenal Ulcers, Ann. Surg. 124:479-491 (Sept.) 1946.
23. (a) Bradley, W. F., Small, J. T., Wilson, J. W., and Walters, W.: Anatomic Considerations of Gastric Neurectomy, J.A.M.A. 133:459-461 (Feb. 15) 1947.
    (b) Miller, E. M., and Davis, C. B., Jr.: An Anatomic Study of the Vagus Nerves; Influence on Choice of Surgical Approach in Patients with Chronic Peptic Ulcer, J.A.M.A. 133:461-462 (Feb. 15) 1947.
24. Dragstedt, L. R.: Vagotomy for Gastroduodenal Ulcer, Ann. Surg. 122:973-989 (Dec.) 1945.

(1.9 per cent) associated with continuous spinal anesthesia was saddle anesthesia, with neurogenic paresis of the bowel and bladder. This man has slowly (after three years) made an almost complete recovery. In one patient the common and pancreatic ducts were severed—a fact which was not realized for several days. Cholecystenterostomy was then done and subsequently the pancreatic fistula was transplanted into the jejunum. The patient has made a satisfactory recovery.

*Following other procedures*

Fourteen of the 17 patients with perforated ulcers recovered (table 7). Two patients had wound disruption (14.2 per cent). Subphrenic abscess and empyema developed in 2 patients (14.2 per cent). Pneumonitis, delirium tremens, and fixation of diaphragm each occurred in 1 patient.

**Table 7**

**Complications in 14 Patients Who Recovered Following Closure of Perforation**

| | *No. Cases* | *Per Cent* |
|---|---|---|
| Wound disruption | 2 | 14.2 |
| Subphrenic abscess; empyema | 2 | 14.2 |
| Pneumonitis | 1 | 7.1 |
| Delirium tremens | 1 | 7.1 |
| Ligation of common duct | 1 | 7.1 |
| Fixation of diaphragm | 1 | 7.1 |
| **Total** | 8 | 57.1 |

Postoperative complications in the 19 patients subjected to posterior gastroenterostomy were rather benign (table 8). Pneumonitis developed in 2 cases (10.5 per cent), and transient obstruction of the stoma in 3 (15.7 per cent). Wound disruption occurred in 1 patient (5.7 per cent), and postoperative cardiospasm in one.

**Table 8**

**Complications in 19 Patients Who Recovered Following Posterior Gastroenterostomy**

| | *No. Cases* | *Per Cent* |
|---|---|---|
| Pneumonitis | 2 | 10.5 |
| Transient obstruction of stoma | 3 | 15.7 |
| Wound disruption | 1 | 5.7 |
| Cardiospasm | 1 | 5.7 |
| **Total** | 7 | 36.8 |

Wound disruption which occurred in 1 patient following excision of a bleeding duodenal diverticulum healed rapidly. One patient had a cerebral accident and bilateral parotitis following anterior gastroenterostomy and jejuno-jejunostomy.

Table 9 summarizes all the complications discussed above. One hundred operations were done on the 91 patients who survived, and 27 (27 per cent) were followed by nonfatal complications. Many of the complications were very minor and are hardly worth discussion. Only 2 of the 7 patients with wound disruption had complete dehiscence with some evisceration. The others had separation of the wound edges involving only the skin or going only to the deep fasciae. Pneumonitis was never widespread, but it was of sufficient severity in 5 cases (5 per cent) to produce symptoms demanding diagnosis.

**Table 9**

**Summary of Non-Fatal Complications Following 100 Operations on 91 Patients**

| | *No. Cases* | *Per Cent* |
|---|---|---|
| Wound disruption | 7 | 7.0 |
| Pneumonitis | 5 | 5.0 |
| Transient obstruction of stoma | 4 | 4.0 |
| Subphrenic abscess and empyema | 2 | 2.0 |
| Cardiac decompensation | 1 | 1.0 |
| Delirium tremens | 1 | 1.0 |
| Infection in incision | 1 | 1.0 |
| Fixation of diaphragm | 1 | 1.0 |
| Ligation of common duct | 1 | 1.0 |
| Cardiospasm | 1 | 1.0 |
| Saddle anesthesia; neurogenic paresis of bowel and bladder | 1 | 1.0 |
| Atelectasis, bronchopneumonia, and decubitus ulcer | 1 | 1.0 |
| Cerebral accident and bilateral parotitis | 1 | 1.0 |
| **Total** | 27 | 27.0 |

Transient obstruction of the anastomotic stoma occurred in 4 patients (4 per cent). In 3 of the 4 (75 per cent) it followed gastroenterostomy, and in only one did it occur following subtotal gastrectomy and subsequent gastrojejunostomy. In 2 patients (2 per cent) subphrenic abscess and thoracic empyema complicated an otherwise normal recovery. Both of these were patients with perforated ulcer. The other complications listed in the table are self-explanatory.

### *Deaths*

The conditions responsible for the 7 deaths in the series are summarized in table 10. All of the deaths were in males. The first patient died following massive hemorrhages, probably from a marginal ulcer. He was only 34 years of age, and had had a gastroenterostomy many years before. When bleeding occurred he was first treated medically, but unsuccessfully. The one death following transthoracic vagotomy resulted from a small Richter's hernia and has already been discussed. Another unfortunate death occurred following a take-down of an old gastroenterostomy in a 38-year-old man with

**Table 10**

**Conditions Responsible for the Seven Deaths in the Series**

| Operation | Cause of Death |
|---|---|
| Posterior gastroenterostomy (old) | Hemorrhage. |
| Transthoracic vagotomy | Strangulated hernia, peritonitis. |
| Take-down of gastroenterostomy | Purpura and hemorrhage. |
| Subtotal gastrectomy, laparotomy, jejunostomy | Hepatorenal syndrome. |
| Closure of perforation 3½ hours after perforation | Subphrenic abscess (refused drainage) |
| Closure of perforation 8 hours after perforation | Peritonitis, gas bacillus, infection of abdominal wall. |
| Closure of perforation 28 hours after perforation | Peritonitis. |

a bleeding, painful marginal ulcer. Postoperatively he developed severe purpura and finally bled fatally from the abdominal wound and the gastrointestinal tract. A 44-year-old man expired following a subtotal gastrectomy and jejunostomy. Autopsy was done, and the hepatorenal syndrome was given by the pathologist as the probable cause of death.

Three deaths followed closure of perforated ulcers. One patient was apparently recovering until a subphrenic abscess developed; he refused surgical drainage and rapidly expired. The second death occurred in a 33-year-old man whose perforation was closed surgically eight hours after onset. A diffuse peritonitis and gas bacillus infection of his abdominal wall developed. The third patient was 57 years old. The possibility of a perforated ulcer was entertained by his surgeon and an internist, but because of the absence of subdiaphragmatic air, the rather atypical symptoms, and the history of cardiac disease, it was believed at first that he had a coronary occlusion. The correct diagnosis was made twenty-eight hours after perforation, but the patient died several hours after surgical closure of the opening in the anterior duodenal wall.

### *Follow-Up Studies*

The results following 95 operations of the types most commonly performed are outlined in table 11. Since 10 of the 91 patients who survived operation could not be followed, only 81 are included in the follow-up analysis.

Of the 51 patients on whom subtotal gastrectomy was done, 42 (82.3 per cent) are asymptomatic after three months to five years. Only 4 (7.8 per cent) complain of symptoms referable to the gastro-intestinal tract. Only 8 (42.1 per cent) of the 19 patients on whom posterior gastroenterostomy was performed are free from symptoms, and an equal number, 8, complain of persistence or recurrence of their digestive difficulties. Of the 14 patients who had closure of their perforations, 7 are now asymptomatic, 6 are still having ulcer symptoms, and one has not been reached in the follow-up study. Illingworth, Scott, and Jamieson(25) found the relapse rate at the end of one year following closure of perforated ulcers to be 40 per cent, but at the end of five years it was 70 per cent. Estes and Bennett(18) and Houston(19) reported "cure" rates of only 5.6 per cent and 38 per cent respectively after closure of perforation.

Seven patients have survived transthoracic vagus resections, and all of them have been followed closely for three to ten months. Five (71.4 per cent) have become asymptomatic, and two (28.5 per cent) are not improved. In one of the failures a diligent search had been made for all the fibers of the right and left vagi, and this patient was thought to be greatly exaggerating his pain until the roentgenologist reported an active duodenal ulcer six months after operation. The second of the patients having pain in spite of his vagus resection is controlling

**Table 11**

**Results Following 95 Operations (All Patients Living)**

| | No. Cases | *Asymptomatic* No. | *Asymptomatic* Per Cent | *Having Symptoms* No. | *Having Symptoms* Per Cent | *No Follow-Up* No. | *No Follow-Up* Per Cent |
|---|---|---|---|---|---|---|---|
| Subtotal gastrectomy | 51 | 42 | 82.3 | 4 | 7.8 | 5 | 9.8 |
| Posterior gastroenterostomy | 19 | 8 | 42.1 | 8 | 42.1 | 3 | 15.8 |
| Closure of perforation | 14 | 7 | 50.0 | 6 | 35.2 | 1 | 7.1 |
| Transthoracic vagotomy | 7 | 5 | 71.4 | 2 | 28.5 | 0 | 0.0 |
| Pylorectomy | 3 | 0 | 0 | 2 | 66.6 | 1 | 33.3 |
| Take-down of gastroenterostomy and subtotal gastrectomy | 1 | 1 | 100.0 | 0 | 0 | 0 | 0.0 |
| **Total** | **95** | **63** | **66.3** | **22** | **23.2** | **10** | **10.5** |

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25. Illingworth, C. F. W., Scott, L. D. W., and Jamieson, R. A.: Progress after Perforated Peptic Ulcer, Brit. M. J. 1:787-790 (May 25) 1946.

most of his symptoms with diet and antacids.

The 2 individuals on whom follow-up studies were made after pylorectomy are still having symptoms.

The one patient living after the take-down of his gastroenterostomy and completion of subtotal gastrectomy is entirely well.

### *Summary*

Experiences associated with the performance of 107 operations on 98 patients in the surgical treatment of duodenal ulcer and its complications are reviewed. A critical analysis is given of the deaths, complications, and results obtained.

## THE TREATMENT OF MENINGITIS IN CHILDHOOD

### *With Particular Reference to the Use of Penicillin and Streptomycin*

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Meningitis is not a common disease during infancy and childhood, but it is an important one as a cause of death. Since the prognosis and treatment of this disease have been completely changed by the recent advances in chemotherapy and antibiotic therapy, it seems worth while to review our experiences with meningitis on the pediatric service of the North Carolina Baptist Hospital.

### *Classification of Cases (Table 1)*

Forty-five patients with meningitis have been admitted to the pediatric service of the North Carolina Baptist Hospital since July 1, 1942. The infecting organisms in these cases were, in order of frequency: influenza bacillus, 14 cases (31 per cent); pneumococcus, 12 cases (27 per cent); tubercle bacillus, 8 cases (18 per cent); meningococcus, 7 cases (15 per cent); Staphylococcus aureus, 2 cases (4.5 per cent); and unidentified organisms, 2 cases (4.5 per cent). During this period, 2 cases of mumps meningo-encephalitis have been seen, but are not included in these figures. No cases seen were due to streptococci, colon-typhoid bacilli, fungi, or spirochetes, the other less common agents causing meningitis in children.

The age distribution was as follows: under 6 months, 8 cases (17 per cent); 6-12 months, 12 cases (27 per cent); 12-24 months, 12 cases (27 per cent); 2-5 years, 4 cases (9 per cent); 5-14 years, 9 cases (20 per cent).

These figures illustrate the accepted facts that meningitis in childhood is most common in children from 6 months to 2 years of age, and that the most important etiologic agents are H. influenzae, the meningococcus, the tubercle bacillus, and the pneumococcus. Eighty per cent of all reported cases of meningitis due to H. influenzae or the tubercle bacillus occur in children under 2 years of age, but the other meningitides are more evenly spread throughout childhood. Seventy-five per cent of the patients in this series were under 2 years of age on admission.

### *Diagnosis*

Two factors are important in the diagnosis of meningitis: (1) recognition of the presence of meningeal infection, and (2) specific identification of the etiologic agent. Since success in therapy is largely dependent on the time elapsing before specific treatment is started, it is imperative that a diagnosis be made early. In most cases the mother seeks medical advice early, and delay in diagnosis is usually due to the physician's failure to recognize the early signs of meningitis.

There is no need to describe in detail the symptoms and signs of advanced menigitis, for this picture of a gravely ill, semi-comatose child in opisthotonos is familiar to everyone. Emphasis must be placed on early diagnosis. As a rule, the onset of meningitis is *sudden* with *fever and chills,* usually accompanied by *vomiting.* The earliest sign of value is the appearance of petechiae scattered over the body; these should suggest meningococcemia before any meningeal signs develop. The earliest sign of meningeal irritation is *nuchal rigidity.* This sign appears in older children rather early, but young infants may show only minimal rigidity of the neck or none at all, even in the presence of definite meningitis. If the examiner is thinking of meningitis, specific meningeal signs may be elicited in cases where a superficial examination will reveal nothing. Other early indications of meningeal irrita-

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## Table 1

| *Case* | *Etiologic Agent* | *Age* | *Duration of Symptoms before Admission* | *Previous Therapy* | *Therapy at the North Carolina Baptist Hospital* | *Result* |
|---|---|---|---|---|---|---|
| K.M. | H. influenzae | 7 mos. | 14 days | Sulfonamide | Sulfadiazine; serum | Died |
| V.L. | " | 20 mos. | 21 days | None | Sulfadiazine; serum | Died |
| R.M. | " | 6 mos. | 28 days | Sulfonamide | Sulfadiazine; serum | Died |
| W.D. | " | 9 mos. | 5 days | Sulfonamide | Sulfadiazine; serum | Died |
| C.M. | " | 10 mos. | 21 days | Penicillin | Sulfadiazine | Died |
| D.M. | " | 4 mos. | 4 days | None | Sulfadiazine; serum | Died |
| J.A. | " | 3 mos. | 4 days | None | Streptomycin; sulfadiazine; serum | Survived |
| J.T. | " | 3 yrs. | 30 days | Sulfonamide; penicillin | Sulfadiazine; serum | Died |
| M.M. | " | 17 mos. | 36 days | Sulfonamide; penicillin | Streptomycin; sulfadiazine; serum | Died |
| S.L. | " | 19 mos. | 21 days | Sulfonamide; penicillin | Streptomycin; sulfadiazine; serum | Survived; severe sequelae |
| S.G. | " | 8 mos. | 30 days | Sulfonamide; penicillin | Streptomycin; sulfadiazine; serum | Survived; moderate sequelae |
| C.S. | " | 28 mos. | 14 days | Sulfonamide; penicillin | Streptomycin; sulfadiazine; serum | Survived |
| R.H. | " | 13 yrs. | 14 days | None | Streptomycin; sulfadiazine; serum | Survived |
| J.T. | " | 7 mos. | 1 day | None | Streptomycin; sulfadiazine; serum | Survived; severe sequelae |
| G.S. | Pneumococcus | 4 mos. | 4 days | Sulfonamide | Sulfadiazine; serum | Survived |
| B.T. | " | 9 yrs. | 2 days | Sulfonamide | Penicillin; sulfadiazine | Survived |
| R.W. | " | 10 mos. | 6 days | Sulfonamide | Penicillin; sulfadiazine | Died |
| R.B. | " | 9 yrs. | 1-21 days | Sulfonamide | Penicillin; sulfadiazine; serum | Died |
| M.G. | " | 13 yrs. | 1 day | Penicillin | Penicillin; sulfadiazine | Survived |
| S.G. | " | 8 mos. | 4 days | Sulfonamide | Penicillin; sulfadiazine | Survived |
| J.H. | " | 13 yrs. | 3 days | Sulfonamide; penicillin | Penicillin; sulfadiazine | Survived |
| K.H. | " | 10 mos. | 4 days | Sulfonamide (?) | Penicillin; sulfadiazine | Survived; possible sequelae |
| D.F. | " | 3 mos. | 1 day | None | Penicillin; sulfadiazine | Survived |
| B.M. | " | 9 mos. | 14 days | Sulfonamide | Penicillin; sulfadiazine | Survived |
| J.C. | " | 3 mos. | 3 weeks | Penicillin | Penicillin; sulfadiazine | Survived; severe sequelae |
| G.C. | " | 2 mos. | 5 days | None | Penicillin; sulfadiazine | Died |
| B.M. | Tbc. bacillus | 3 yrs. | 2 weeks | None | None | Died |
| W.B. | " | 15 mos. | indefinite | None | None | Died |
| J.I. | " | 22 mos. | 5 weeks | None | None | Died |
| S.H. | " | 16 mos. | 4 mos. | None | None | Died |
| L.D. | " | 5 mos. | 10 days | None | None | Died |
| R.G. | " | 6 yrs. | 3 mos. | None | None | Died |
| C.M. | " | 19 mos. | 1 mo. | None | None | Died |
| R.M. | " | 13 mos. | 2 weeks | Sulfonamide | None | Died |
| F.S. | Meningococcus | 6 mos. | 4 days | None | Sulfadiazine | Survived |
| L.L. | " | 3 yrs. | 1 day | None | Sulfadiazine | Survived |
| R.C. | " | 19 mos. | 3 days | Sulfonamide | Sulfadiazine | Survived |
| J.L. | " | 6 yrs. | 3 days | Sulfonamide | Penicillin; sulfadiazine | Survived |
| J.C. | " | 1 yr. | 1 day | None | Penicillin; sulfadiazine | Survived |
| K.M. | " | 14 mos. | 1 day | Sulfonamide | Sulfadiazine | Survived |
| Baby S. | " | 2 mos. | 1 day | Sulfonamide | Penicillin; sulfadiazine | Survived |
| J.A. | Staphylococcus aureus | 10 yrs. | 3 days | None | Antitoxin; sulfadiazine; penicillin | Survived |
| R.D. | " | 17 mos. | 2 weeks | Sulfonamide | None | Died |
| H.B. | Unknown | 6 mos. | 20 days | None | Sulfadiazine | Survived |
| F.F. | " | 5 yrs. | 1 day | None | Penicillin; sulfadiazine | Survived |

tion are positive *Kernig* and *Brudzinski* signs. *Hyperactive deep reflexes*, especially knee jerks, may be the only definite signs pointing to meningeal involvement.

Since meningitis is the most common cause of *increased intracranial pressure* in childhood, this finding is of particular importance. Signs suggesting increased intracranial pressure are *vomiting*, the sudden appearance of a *high-pitched cry*, *convulsions*, and a *bulging fontanelle*. This last finding is of particular value in infants under 1 year of age; a normally soft fontanelle does not rule out early meningitis, however.

The final diagnosis, of course, depends on the *lumbar puncture*. Because of its simplicity and lack of danger, this procedure should be done much more frequently than is customary when there is any suspicion of meningitis. The finding of a cloudy fluid with a predominance of polymorphonuclear cells confirms the diagnosis of a purulent meningitis. Clear fluid with only a moderate increase of cells, especially mononuclears, makes one suspect that the meningitis is due to the tubercle bacillus or to the virus of mumps or of lymphocytic choriomeningitis. In patients with late tuberculous meningitis, however, the fluid may be grossly cloudy, and very early in the course of meningitis due to other organisms the fluid may show only a slight mononuclear response.

Careful examination of stained spinal-fluid smears and cultures of spinal fluid, blood, or the petechiae will usually demonstrate the true etiologic agent. This is not a simple procedure, for even well trained bacteriologists often have difficulty in isolating the offending organism. Fortunately, H. influenzae and pneumococci can usually be seen on direct smears, and capsular swelling of the organism can be demonstrated under the microscope when a drop of spinal fluid is mixed with a drop of specific antiserum. Every effort should be made to isolate the offending agent before therapy is begun, since it is often difficult to grow organisms from the spinal fluid after treatment is started. In cases where the patient has received sulfonamides or antibiotics before admission, we have found that inoculation of an embryonated chicken egg according to the technique of Blattner and his coworkers(1) has been of help in the isolation of the organism.

### *Treatment*

Once the specific diagnosis is made, the appropriate treatment (table 2) is immediately started. Sodium *sulfadiazine* is given subcutaneously to the seriously ill or comatose patient. The usual initial dose is ½ grain per pound of body weight (75 mg. per kilogram). If the patient is to be maintained on parenteral sulfadiazine, the daily dose is approximately 1 grain per pound (150 mg. per kilogram). This dose is given in two to three injections. The daily oral dose is started at 1 grain per pound (150 mg. per kilogram), divided into six doses. This dose is varied to maintain the proper blood level, which should be between 10 and 15 mg. per 100 cc. Daily doses as high as 3 to 4 grains per pound may be necessary to maintain this level.

Since these patients are dehydrated, they are unusually susceptible to the renal complications of sulfadiazine therapy. Sufficient fluids are administered either subcutaneously or intravenously to maintain a good urinary output, and the urine should be kept alkaline. In the comatose patient sixth molar sodium lactate solution is administered subcutaneously in doses of 7 to 10 cc. per pound of body weight. When the patient is able to

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1. Blattner, R. J., Heys, F. M., and Hartmann, A. F.: Advantages of Egg Culture Technic in Infectious Diseases, Arch. Path. 36:262-268 (Sept.) 1943.

**Table 2**
**Plan of Treatment**

| *Etiologic Agent* | *Drug* | *Route of Administration* |
|---|---|---|
| Hemophilus influenzae, type "B" | Sulfadiazine | Intravenous, subcutaneous, or oral |
| | Streptomycin | Intramuscular or intravenous |
| | Specific antiserum | Intravenous; also intrathecal in certain chronic cases |
| Pneumococcus<br>Staphylococcus<br>Streptococcus | Sulfadiazine | Intravenous, subcutaneous, or oral |
| | Penicillin | Intramuscular or intravenous; also intrathecal* |
| Meningococcus | Sulfadiazine | Intravenous, subcutaneous, or oral |
| | Penicillin | Intramuscular; also intrathecal in severe cases |
| Tubercle bacillus | Streptomycin (May be of value) | Intramuscular and intrathecal |

take oral medication, sodium bicarbonate is given in doses of approximately 3 grains per pound per day. This amount is given in divided doses, and is varied according to the urinary *p*H.

*Penicillin,* administered parenterally in doses of 2000-3000 units per pound per day, has given satisfactory results in our hands, but it is possible that even better results would follow doses of 5000 units per pound. No complications have occurred from the intrathecal use of penicillin in doses of 3000-10,000 units daily*.

The only known serious toxic effect of *streptomycin* is transient paralysis of the eighth nerve. Streptomycin elicits a spinal-fluid cellular response which may make it difficult to decide when to stop treatment. The daily intrathecal dose is 0.025 to 0.05 Gm. This is administered in a solution containing 0.005 Gm. per cubic centimeter. The daily intramuscular dose of streptomycin has been arbitrarily put at 0.02 Gm. per pound. This amount is given in divided doses every three hours.

The only specific *antiserum* which we now use is anti-H. influenzae, type B, serum (rabbit). Authorities agree that the safest procedure in treating influenzal meningitis is to use the antiserum in conjunction with sulfadiazine and streptomycin. The initial dose of antiserum depends on the spinal-fluid sugar (table 3).

**Table 3**

**Initial Dosage of H. Influenzae Antiserum(2)**

| *C.S.F. Sugar (mg. per 100 cc.)* | *Antibody Nitrogen (mg.)* |
|---|---|
| 0-10 | 150 |
| 10-25 | 100 |
| 25-40 | 75 |
| 40 or above | 50 |

The serum is given daily until the patient's serum, diluted 1:10, causes capsular swelling of the organism. Serum is given intrathecally in chronic cases; the intrathecal dosage is 25-50 mg. daily.

It is difficult to decide when to stop therapy. In 2 patients with pneumococcal meningitis relapses occurred on three occasions the day after intrathecal penicillin was discontinued, in spite of the fact that they continued to receive large doses of intramuscular penicillin and sulfadiazine. Another patient with pneumococcal meningitis had one relapse after intrathecal penicillin was stopped. All 3 patients recovered with continued intrathecal penicillin. One infant with meningococcal meningitis who had been apparently well for ten days had a relapse twenty-four hours after parenteral penicillin and sulfadiazine were stopped. The infant recovered after resumption of therapy. We continue treatment until the spinal fluid has been sterile for at least five days, and until the patient reacts normally to his surroundings.

### *Results (Table 4)*

Our results with the treatment of *influenzal meningitis* have improved markedly since we began using streptomycin. The only death which has occurred since that time was in a child who had had meningitis for thirty-six days before admission. However, half of the 6 patients who recovered under streptomycin therapy have varying degrees of central nervous system damage.

Three of the 12 patients with *pneumococcal meningitis* died. One of these died ten hours after admission. The second case was resistant to treatment with large amounts of sulfadiazine, intramuscular and intrathecal penicillin, and type-specific antiserum. The third (G. C.) was moribund on admission, and never responded to therapy with sulfadiazine and penicillin. Only one of the patients who recovered has any neurologic sequelae. This infant (J. C.) has persistent opisthotonos and is questionably retarded.

There have been no deaths or sequelae in the 7 patients with *meningococcal meningitis.* One patient (J. L.) had anuria following sulfadiazine therapy before admission to the North Carolina Baptist Hospital. Evidences of myocarditis also developed, but subsequently cleared.

One patient with meningitis following a staphylococcal brain abscess and subacute bacterial endocarditis responded to therapy with sulfadiazine, penicillin, and staphylococcus antitoxin, but died two years later of cardiac failure. The other patient with *staphylococcal meningitis* died before chemotherapeutic or antibiotic therapy was

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* Because of the difficulty and possible complications associated with repeated intrathecal injections of penicillin, it would be advantageous to give up this route. Two infants with pneumococcic meningitis seen since this paper was written have been treated successfully with larger doses of parenteral penicillin (15,000-20,000 units per pound per day), but with only one intrathecal dose. It is hoped that the use of these very large doses of parenteral penicillin will be as effective as the results from combined parenteral and intrathecal therapy.

2. Alexander, H. F.: Personal communication.

Table 4
Results of Treatment

| *Etiologic Agent* | *No. Cases* | *No. Survived* | *Percent. Survived* | *Remarks* |
|---|---|---|---|---|
| H. Influenzae | 14 | 6 | 43 | |
| Without streptomycin | 7 | 0 | 0 | |
| With streptomycin | 7 | 6 | 86 | 3 patients with residual damage |
| Pneumococcus | 12 | 9 | 75 | 1 patient with residual damage |
| Tubercle bacillus | 8 | 0 | 0 | |
| Meningococcus | 7 | 7 | 100 | |
| Staphylococcus aureus | 2 | 1 | 50 | Patient died later of cardiac failure |
| Unclassified | 2 | 2 | 100 | |
| **Total** | 45 | 25 | 55 | |

started.

None of the 8 patients with *tuberculous meningitis* received streptomycin and none recovered. Two patients recovered from *undiagnosed meningitis* which was treated early in the course of the disease. In each case gram-positive cocci were seen in the smear of the cerebrospinal fluid on one occasion, but they were not identified.

*Factors affecting results*

The two most important factors affecting the prognosis in meningitis are the duration of the illness before specific therapy is started, and the age of the patient. In this series these factors have been significant only in the patients with influenzal meningitis. Seventy-two per cent of these 14 patients had been sick for two weeks or longer at the time of admission. Two of the 3 patients who developed neurologic sequelae were sick for three weeks or more before specific treatment was started. The one patient who died since streptomycin has been used had had meningitis for thirty-six days before admission. There is no evidence in our series that the age of the patients affected the mortality rate, but the 3 patients with residual neurologic lesions were less than 2 years old.

A striking improvement in results has followed the recent change in the therapy of influenzal meningitis. In the two comparable groups of 7 patients each, the mortality in those treated with sulfadiazine and specific antiserum was 100 per cent, whereas in those who received streptomycin in addition to sulfadiazine and antiserum the mortality was 14 per cent.

*Comparison of results*

Ross and Burke(3) reported 19 cases and Hutchins and Davies(4) 14 cases of *pneumococcal meningitis* treated by methods similar to those employed in this series. The recovery rates were 84 per cent and 64 per cent respectively, which compare with the 75 per cent recovery rate in our patients. Both groups reported neurologic sequelae occurring in survivors.

Birmingham and his co-workers(5), Nussbaum and others(6), and Alexander(7) have reported a total of 30 cases of *influenzal meningitis* treated with streptomycin with and without other therapy. The recovery rate in these cases was 80 per cent, and 6 children had sequelae. These figures compare with the results in our cases of influenzal meningitis treated with streptomycin. Our recovery rate was 86 per cent, and 3 children had neurologic sequelae.

## *Summary*

(1) Forty-five cases of meningitis in children are reviewed.

(2) The importance of prompt diagnosis and early institution of specific therapy is emphasized.

(3) Factors affecting the results of treatment are discussed, and our results with the use of streptomycin are compared with those of other authors.

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3. Ross, S., and Burke, F. G.: Pneumococcus Meningitis in Infants and Children, J. Pediat. 29:737-757 (Dec.) 1946.
4. Hutchins, G., and Davies, J. A. V.: Penicillin Treatment of Pneumococcus Meningitis in Infants, J. Pediat. 27:505-515 (Dec.) 1945.
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**Routine Test of the Urine in Diabetes.** — The omission of the routine test of the urine is dangerous in diabetes. I always dread to have a patient give up testing because for a time he has found his urine constantly sugar free. Of course some patients can rightly do this. The ordinary patient, however, should test the urine daily. Over and over again the rule has been relaxed only to find later that the diet has also been relaxed. Thousands of useless tests are better than the failure to recognize the return of active diabetes with or even without the development of diabetic coma.—Elliott P. Joslin: Diabetic Hazards, New England J. Med. 224:591 (April 3) 1941.

# REGIONAL ENTERITIS

## *With Observations Concerning Its Pathogenesis*

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Inflammatory swellings of unknown etiology and pathogenesis have been noted in the intestinal tract by numerous observers over a period of many years. It was not until 1932, however, when Crohn, Ginzburg, and Oppenheimer(1) published their epochal contribution, that the importance of these lesions became fully realized. From the heterogeneous group of cases which had been described as "benign granulomas of the intestinal tract," these authors separated a chronic inflammatory disease which was confined to the terminal ileum and its adjacent mesentery and lymph nodes, and reported their findings in 14 cases of this type. They felt that their cases were representative of a definite clinical and pathologic entity, which was characterized by a chronic inflammatory process resulting in swelling, obstruction, and tumefaction of the terminal ileum. Although they had not had an opportunity to examine histologically tissues removed in the early or acute stages of the disease, they recognized the possibility that the disease might exist in an acute form, and postulated a relationship between it and the chronic variety.

Since this paper was published, numerous communications have appeared in the literature which have elucidated various points concerning the condition(2). It is now known that nonspecific inflammatory swellings which are clinically and pathologically similar to the lesions in the terminal ileum described by Crohn and his associates may be encountered in any part of the intestinal tract. Although the disease is most often confined to a sharply demarcated segment of bowel—usually the terminal ileum—, multiple lesions have been encountered in some cases.

Clinically the disease is seen in an acute and a chronic form, and a subacute variety has also been described(3). A definite pathologic relationship between the various clinical types of the disease, however, has not been definitely established; nor has it been absolutely proved that the acute phase of the disease necessarily progresses into a chronic or cicatrizing form.

### *Acute*

The majority of the cases recognized in the earliest stages have been those in which the disease was confined to the terminal ileum. In these cases a sharply demarcated segment of edematous bowel was found at operation, usually following a mistaken diagnosis of acute appendicitis. The involved segment had the consistency of sponge rubber, and in some cases the serosa was injected. The adjacent mesentery was thickened and edematous, and the regional lymph nodes showed various degrees of enlargement. A small amount of clear or serosanguineous fluid was usually encountered in the peritoneal cavity.

Because of the paucity of available material, the more detailed pathology of this stage of the disease is poorly understood. Holloway(3), however, has suggested that initially there is a slight ulceration of the bowel, which is followed by a marked edematous thickening of all coats of the structure. This edema is associated with varying degrees of cellular infiltration, which is usually in proportion to the severity of the disease. Hadfield(4), whose work is widely quoted, is of the opinion that the earliest histologic lesion is located in the submucosa of the bowel and is characterized by lymphadenoid hyperplasia and the formation of non-caseating giant-cell systems. He also describes identical lesions in the regional lymph nodes, and postulates that the ulceration and fistula formations are secondary to the obstructive lymphedema produced by the proliferative process in the submucosa.

There is general agreement that surgical intervention is not indicated in the acute stages of the disease. The abdomen is frequently opened, however, in the belief that the patient is suffering from acute appendicitis. Opinions differ regarding the advisability of performing an appendectomy, once the abdomen has been entered. Some observers, fearing the danger of fistula formation,

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2. Shapiro, R.: Regional Enteritis: A Summary of the Literature, Am. J. M. Sc. 198:269-292 (Aug.) 1939.
3. Holloway, J. W.: Regional Ileitis, Ann. Surg. 118:329-342 (Sept.) 1943.
4. Hadfield, G.: The Primary Histological Lesion of Regional Ileitis, Lancet 2:773-775 (Oct. 7) 1939.

elect to leave the appendix in place. Others feel that the danger of this complication is not appreciably increased by appendectomy, and that it is well to remove the appendix prophylactically.

### *Chronic*

The chronic stages of the disease have been adequately described, both clinically and pathologically(2). As the result of a proliferative and exudative inflammatory process the involved segment of bowel becomes thickened and rigid, and ultimately a mass is formed. There is pronounced inflammation in the adjacent mesentery and regional lymph nodes, and ulcerations of the mucosa occur. Initially, these are usually located adjacent to the mesenteric border of the bowel. The ulcerations vary from superficial to deep, and as the disease progresses they may become a prominent feature of the pathologic picture. Adhesions form between adjacent loops of bowel, and perforation and fistula formation are common. As the chronic inflammatory process progresses, the lumen of the bowel becomes markedly diminished in caliber, and varying degrees of intestinal obstruction develop.

Microscopically, a chronic inflammatory reaction is seen which is most marked in the submucosa, and is characterized by edema, mononuclear infiltration, and a productive fibrosis. The giant-cell systems described by Hadfield(4) may or may not be demonstrable.

Roentgen studies of the small bowel are essential for the diagnosis of regional enteritis. Bockus(5) has pointed out that, except in those patients with definite obstruction or with symptoms simulating acute appendicitis or peritoneal irritation, one is not justified in opening the abdomen when no abnormality can be demonstrated roentgenographically.

### *Etiology and Pathogenesis*

The etiologic agent in regional enteritis has not been demonstrated. Although practically all types of causative agents have been incriminated, evidence points toward bacterial infection as the primary or exciting cause of the disease. The condition has been encountered in practically all age groups, but reaches its greatest incidence in the third decade. Few cases have been reported in Negroes, and the southern part of the United States appears to be partially immune. Bockus(5) states that many of his cases have occurred in nervous, excitable persons and comments that he has encountered very few instances of the condition in phlegmatic individuals.

The pathogenesis of the condition is as poorly understood as is its etiology. The primary site of attack has not been established, and there is no convincing information regarding the sequence of pathologic events.

A case recently observed in this hospital suggests certain possibilities in this connection.

### *Report of Case*

A white female, aged 22, was admitted to the North Carolina Baptist Hospital February 16, 1947, complaining of abdominal pain of six hours' duration. The patient stated that she was awakened from sleep at 4 a.m. on the day of admission by a severe peri-umbilical pain which was associated with epigastric discomfort. The pain was continuous and dull in character, although at times it became colicky and sharp. She had vomited three times since the onset of the pain, but had had no bowel movement.

The past medical history revealed that a pilonidal cyst had been successfully excised in 1942. Her menses had been somewhat irregular but frequent, occurring approximately every two weeks. She stated that she had had "frequent attacks of flu" and had suffered from "rheumatism" in her right thigh during the winter of 1946.

Physical examination revealed a patient who was obviously ill and in considerable pain. The temperature was 98 F., the pulse 60, respiration 24, and blood pressure 114 systolic, 80 diastolic. The upper part of the abdomen was rigid. Tenderness was present throughout the abdomen, but was most pronounced in the right upper quadrant and least marked in the left lower quadrant.

The urine was clear and yellow and had a specific gravity of 1.022. The white blood cells numbered 21,300 per cubic millimeter of blood, and the serum amylase was 79 Somogyi units.

A diagnosis of "acute abdomen" was made, and the abdomen was opened through a right rectus incision nine hours following the clinical onset of the illness. The appendix was found to be red, edematous, and adherent to the parietal peritoneum. Although the organ was obviously inflamed, it did not present the usual picture encountered in primary appendicitis. Upon further investigation the ileum and jejunum, as well as the cecum and appendix, were found to be involved in a segmental inflammatory process. The serosal surface of the involved segments of bowel presented a peculiar, splotchy-red appearance, and the walls were greatly thickened and edematous. Interspersed between these segments of bowel were portions which appeared to be quite normal. At one point in the mid-ileum the bowel was twisted upon itself and incarcerated by a small adhesion which ran from a loop of the jejunum down to the mesentery. When this was freed, it became apparent that frank intestinal obstruction did not exist at this point. Peristalsis was not evident. The mesentery was involved in the inflammatory process, and there was considerable mesenteric lymphadenopathy. A small amount of serosanguineous fluid was present in the peritoneal cavity.

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5. Bockus, H. L.: Present Status of Chronic Regional or Cicatrizing Enteritis, J.A.M.A. 127:449-456 (Feb. 24) 1945.

The appendix was removed, along with a small lymph node from the mesentery, and the abdomen was then closed. Smear and culture from the surface of the bowel and from the peritoneal fluid were reported as negative. Following the operation a Miller-Abbott tube was inserted, and the patient was given sulfasuxidine. On the second day following operation the patient's condition was remarkably good. She was discharged from the hospital on the ninth day, clinically well.

Microscopic examination of sections taken from the proximal, middle, and distal thirds of the appendix showed the wall to be thickened by an active inflammatory process, which was most pronounced in the serosa. In the mucosal crypts of the proximal portion of the organ were small, wedge-shaped ulcerations which extended into the wall as far as the muscularis mucosae. The ulcerative lesion in the mucosa was primarily one of necrosis, and the cells showed all degrees of degeneration. Numerous red blood cells were present within the necrotic areas, and it was impossible to determine whether they had resulted from hemorrhage or were present in response to an irritant. Eosinophils were present in moderate numbers, and an occasional lymphocyte was seen. The superficial ulcerations fanned out into the lamina propria of the organ, and frequently communicated with ulcerations which had been produced in adjacent crypts.

In the innermost portions of the submucosa there was a chronic inflammatory reaction characterized by mononuclear and eosinophilic infiltrations and the formation of lymphatic nodules. A moderate number of eosinophils, as well as an occasional lymphocyte, were seen in the muscular coats. The serosa was greatly thickened as a result of the inflammatory process, and here cellular infiltration and reaction of the fixed tissue cells were marked. The coat was edematous, and large numbers of plasma cells, lymphocytes, and monocytes occupied the tissue spaces. The capillaries were numerous and dilated, and endothelial activity was pronounced. The fibroblasts were prominent, and the mesothelium, where present, was several layers thick.

Sections from the middle and distal thirds of the appendix showed a process identical with that seen in the proximal third, except that mucosal lesions were not encountered.

## *Discussion*

The findings in this appendix were essentially those usually associated with a chronic inflammatory disease; yet the patient had complained of abdominal symptoms for only nine hours prior to operation. Another point of interest is the suggestion of a pathogenetic similarity to the development of acute inflammation in the vermiform appendix. To facilitate a discussion of this relationship, a brief review of the more pertinent information concerning the etiology and pathogenesis of appendicitis seems proper.

Acute appendicitis begins as an acute inflammatory lesion in the epithelium of one or more of the folds of the mucosa, the distal segment being usually involved(6). The process is typically one of acute inflammation and extends in a wedge-shaped manner to the serous coat, where an exudative serositis is produced. The disease spreads much more slowly in the mucosa than in the remaining coats, where it extends lengthwise by way of the lymphatics. As the disease progresses, the inflammatory process spreads in the mucosa from one crypt to another, and ultimately the entire wall of the organ is involved in a phlegmonous inflammation. The mucosal lesions, however, are confined for a considerable period of time to the segment of the organ initially involved. There is good evidence that the disease spreads as a result of the elaboration and dissemination of bacterial toxins, before the organisms themselves have traversed the lymph spaces and lymphatics.

Aschoff(6) is of the opinion that the appendix has its own bacterial flora and that gram-positive, non-hemolytic streptococci, enterococci, and at times pneumococci are the causative organisms in appendicitis. He has contended that these organisms are capable within themselves of initiating an acute inflammatory reaction in the appendix. Ricker(7), on the other hand, believes that the disease begins as the result of a reflex disturbance in the circulation, and that the initial lesion is one of pure ischemic necrosis, followed by secondary bacterial invasion.

It will be recalled that in the case presented in this paper the mucosal lesion was primarily one of necrosis, which persisted as such. This alteration in the mucosa was apparently followed by a chronic inflammatory reaction which spread by way of the lymphatics and was most pronounced in the serosa—probably because of the rich lymphatic plexus in this coat. Thus, a striking similarity is seen between the pathologic changes in regional enteritis and those in acute appendicitis. The two diseases differ, however, in that persistent mucosal necrosis characterizes the former, while in cases of acute appendicitis an exudative inflammatory process is present by the time the organ is available for study. The two diseases differ also in that the tendency in most cases of acute appendicitis is toward healing, while in regional enteritis it is toward chronicity.

## *Conclusions*

The observations in the case presented suggest a possible explanation of the patho-

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6. Aschoff, L.: Appendicitis: Its Aetiology and Pathology, London, Constable and Company, Ltd., 1932.

7. Ricker, G.: Pathologie als Naturwissenschaft, Berlin, Julius Springer, 1924.

genesis of regional enteritis. The disease appears to begin as a necrotizing process in the crypts of the mucosa. Its high incidence in neurotic individuals suggests the possibility of vasospasm as the initiating factor in the degenerative process. Mucosal necrosis is followed by bacterial invasion, which results in inflammation. This process, although conceivably acute in its onset, rapidly becomes chronic in character and spreads throughout the organ by way of the lymphatics in a manner similar to that observed in acute appendicitis. Differences in the distribution of lymphatics in the submucosa of the appendix and in the small bowel may account for the more pronounced involvement of this structure in the latter.

Failure to obtain positive smears and cultures in cases of clinically acute regional enteritis may be explained on the hypothesis that the organisms remained localized in the mucosa for a considerable period of time, and that the inflammatory reaction in the other coats was initiated by bacterial toxins.

Additional studies are necessary before the pathogenesis of this condition can be established.

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# THE USE OF BAL IN THE TREATMENT OF HEAVY-METAL POISONING

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One of the many developments of medical importance during World War II was the British discovery of a substance useful in preventing and treating the toxic effects of Lewisite gas. When Lewisite, a war gas, comes in contact with human skin, it acts as a vesicant and secondarily, by the liberation of arsenic, produces systemic arsenic poisoning in the victim. When it is inhaled, it produces intense bronchial irritation, with spasm and copious mucoid secretion; arsenic is absorbed from bronchial mucosa as well as from the skin. Contact of Lewisite with the eye results in intense conjunctivitis and later in extensive corneal damage(1).

In the search for an agent effective in counteracting the effects of Lewisite the British investigators, Peters, Stocken and Thompson(2), found that 2,3-dimercaptopropanol, when applied to the skin before exposure, possesses the ability to neutralize the toxic effects of Lewisite. Later it was found that the material can be injected, and that it is capable of neutralizing the effect of arsenic previously absorbed. From these findings it was deduced that this substance, which was named British Anti-Lewisite (BAL), could be used both as a prophylactic measure before exposure, and as a therapeutic measure after exposure to the gas. This knowledge was made known to the United States, and a supply of the drug was received in this country in 1941. Well before the end of the war BAL, manufactured in this country, was furnished to the armed forces in generous quantities. For security reasons the drug was kept secret during the war, but has now been released(3) and is available on open market(4).

## *Mechanism of Action*

There is evidence that the mechanism by which arsenic produces intoxication in experimental animals and in man is by interference with certain enzyme systems—particularly the pyruvate oxidase system—responsible for the metabolism of fat and carbohydrate. This interference is believed to be due to the fact that arsenic combines with sulfhydryl groups of the enzyme within the cells involved, inhibiting the enzymatic activity and thereby interfering with tissue respiration(5). BAL, a dithiol, by providing available sulfhydryl groups, is able to combine with the arsenic, permitting its excretion by the kidney in a relatively non-toxic form(6). Indeed, it is capable of competing successfully with the enzymes for the arsenic fixed in the tissues, thus actually removing bound arsenic from the enzymes. In this

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1. Adams, B. H.: The Treatment of Chemical Warfare Casualties, U. S. Nav. M. Bull. 38:218-231 (April) 1940.
2. Peters, R. A., Stocken, L. A., and Thompson, R. H. S.: British Anti-Lewisite (BAL). Nature, 156:616 (Nov. 24) 1945; cited by Waters and Stock(5a).
3. "BAL" (British Anti-Lewisite) in the Treatment of Arsenic and Mercury Poisoning. Report of the Council on Pharmacy and Chemistry. J.A.M.A. 131:824 (July 6) 1946.
4. American Reference Standard BAL is now available in 10 per cent solution in peanut oil containing 20 per cent benzyl benzoate (Hynson, Westcott and Dunning).
5. (a) Waters, L. L., and Stock, C.: BAL (British Anti-Lewisite). Science 102:601-606 (Dec. 14) 1945.
   (b) Braun, H. A., Lusky, L. M., and Calvery, H. O.: The Efficacy of 2,3-Dimercaptopropanol (BAL) in the Therapy of Poisoning by Compounds of Antimony, Bismuth, Chromium, Mercury, and Nickel. J. Pharmacol. & Exper. Therap. 87:119-125 (Aug.) 1946.
6. Eagle, H., Magnuson, H. J., and Fleischman, R.: The Systemic Treatment of Experimental Arsenic Poisoning (Mapharsen, Lewisite, Phenyl Arsenoxide) with BAL. J. Clin. Investigation 25:451-466 (July) 1946.

manner the depressed enzyme system is reactivated(2,5a).

### *Arsenic Poisoning*

#### *Experimental*

In view of these facts it naturally follows that BAL would deserve a trial in the treatment of arsenic poisoning. The drug proved useful in treating arsenic poisoning in experimental animals. It was found that the intramuscular injection of 1 to 10 mg. of BAL per kilogram of body weight saved approximately half of the animals which had previously received lethal injections of mapharsen, Lewisite, or phenylarsinoxide(6). The margin of safety between the therapeutic and toxic doses of BAL was found to be sufficiently wide to justify its use in patients.

Wexler and his coworkers(7) found that in man a single injection of BAL in a dosage of 3.5 mg. per kilogram of body weight increased the urinary excretion of arsenic both in controls and in men exposed to arsenic smoke. The increase was greatest in those men treated soon after exposure to the smoke.

In 16 patients with arsenic intoxication and 2 patients receiving arsenical therapy without reaction, Leutscher, Eagle, and Longcope(8) found that the excretion of arsenic was definitely increased following sixteen to twenty-four courses of BAL; in 4 other patients the excretion was probably increased, and in 4 more it was not influenced. The increase of arsenic excretion after BAL seems to be more consistent in patients with arsenical dermatitis than in patients with arsenical hepatitis. This finding suggests that BAL is more efficient in removing arsenic from enzymes of the skin than from the hepatic enzymes.

In rabbits it was found that the ocular instillation of 5 per cent BAL solution two to five minutes after exposure of the eye to Lewisite effectively prevented the development of permanent ocular lesions(9).

#### *Clinical*

In clinical use BAL was found to be as efficacious as it had proven to be in experimental studies. Carleton and others(10) reported 18 cases of arsenical dermatitis treated with BAL, with good results. Longcope and his coworkers(11) treated 22 cases of arsenical dermatitis with BAL. This group consisted of 7 cases of intractable dermatosis caused by Adamsite and 15 cases of arsenical exfoliative dermatitis resulting from antisyphilitic therapy. The first group was treated with BAL ointment and the latter by intramuscular BAL. Symptomatic improvement occurred regularly following treatment. In more than half the cases the course of illness was shorter than in similar untreated controls.

Eagle and Longcope(3), following a survey of 200 reported cases of arsenic poisoning treated with BAL, stated that "the results indicate that the danger of arsenic poisoning can be greatly reduced by early adequate treatment with BAL." From their report it is apparent that in about 80 per cent of patients with arsenical dermatitis treatment with BAL stops the progress of the inflammatory reaction and accelerates the healing process. About 20 per cent did not respond to therapy. In 10 out of 11 cases of arsenical agranulocytosis the administration of BAL was followed by an increase in the total white blood cell count and a proportionately greater increase in the number of polymorphonuclear leukocytes. In arsenical jaundice there were indications that BAL therapy accelerated recovery in one third of the cases; two thirds were unaffected. BAL produced no observable effect in 3 cases of aplastic anemia following arsenotherapy.

In 55 reported cases of arsenical encephalitis treated with BAL the mortality was 11.7 per cent(12). Prior to the advent of BAL, encephalitis was a highly fatal complication of arsenical therapy. In the patients of this group who recovered improvement was seen within twenty-four to forty-eight hours after the beginning of treatment, and recovery was usually complete within four days.

#### *Dosage*

A satisfactory dosage schedule has been proposed by Eagle and Longcope(3). In severe cases of arsenic poisoning 3 mg. of BAL

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7. Wexler, J., *et al.*: The Effect of BAL on Excretion of Arsenic in Normal Subjects and after Minimal Exposure to Arsenical Smoke, J. Clin. Investigation 25:467-473 (July) 1946.
8. Leutscher, J. A., Jr., Eagle, H., and Longcope, W. T.: The Effect of BAL on the Excretion of Arsenic in Arsenical Intoxication, J. Clin. Investigation 25:534-540 (July) 1946.
9. Hughes, W. F., Jr.: The Treatment of Lewisite Burns of the Eye with BAL, J. Clin Investigation 25:541-548 (July) 1946.
10. Carleton, H. B., *et al.*: The Treatment of Complications of Arseno-Therapy with BAL, J. Clin Investigation 25: 497-527 (July) 1946.
11. Longcope, W. T., *et al.*: The Treatment of Arsenical Dermatitis with Preparations of BAL, J. Clin. Investigation 25: 523-533 (July) 1946.
12. Eagle, H. and Magnuson, H. J.: The Systemic Treatment of 227 Cases of Arsenic Poisoning with 2,3-Dimercaptopropanol (BAL), Am. J. Syph., Gonor., & Ven. Dis. 30:420-421 (Sept.) 1946.

per kilogram of body weight may be given intramuscularly every four hours for the first two days; on the third day four injections are given, and thereafter injections are given twice daily for ten days, or until recovery is complete. In milder cases somewhat smaller doses (2.5 mg. per kilogram) may be given four times daily for two days, twice on the third day, and once daily thereafter for ten days or until recovery is complete. It must be emphasized that best results are obtained when therapy is started early in the course of poisoning.

### *Mercury Poisoning*

#### *Experimental*

Since it is apparent that other heavy metals produce toxic effects in a manner similar to that of arsenic—that is, by inhibiting the action of sulfhydryl-containing enzymes, and thereby interfering with tissue respiration—it follows logically that BAL would also be useful in the treatment of poisoning by other heavy metals. In animals it has been shown that BAL and other related dithiols are effective in the prophylaxis and treatment of acute mercury poisoning(13). Therapy was seen to be progressively less effective with decreasing dosage of the drug or increasing delay in the initiation of treatment.

#### *Clinical*

Longcope and others(14) have reported 23 cases of acute mercury poisoning treated by BAL, with excellent results. These patients had swallowed mercury bichloride in amounts varying from 0.5 Gm. to 20 Gm. There was only one death in this series. Larger doses of the drug appear to be indicated in mercury poisoning than in arsenic poisoning. An initial dose of 5 mg. per kilogram may be followed in one to two hours by an injection of 2.5 mg. per kilogram. This latter dose may be repeated once or twice during the first twelve hours, depending on the severity of poisoning. Thereafter doses of 2.5 mg. per kilogram may be given two or more times daily, depending on the indications. In the series reported by Longcope 18 patients received total dosages varying from 1200 to 2870 mg.

### *Poisoning by Other Heavy Metals*

Information concerning the use of BAL in the treatment of poisoning by other heavy metals is somewhat limited. From experiments with heavy-metal poisoning in rabbits(5b), it appears that BAL is an effective antidote in acute poisoning by antimony, bismuth, chromium, nickel(5b), and cadmium(15). It was found that the tolerance of rabbits to lethal doses of these metals, as well as of mercury, was increased by at least 50 per cent. BAL has also been recommended for the treatment of toxic reactions resulting from gold therapy in patients with rheumatoid arthritis(16).

Recently three groups of workers(17) have reported a total of 12 cases of gold intoxication treated with BAL—10 cases of dermatitis, 1 of granulopenia, and 1 of thrombopenia. In 9 of the 10 cases of dermatitis the treatment was followed by rapid subsidence of the skin lesions; the one failure occurred in a patient who had had the rash for three months. "Spectacular" results were described in the 2 patients with hematologic disturbances.

In experimental poisoning with lead, thalium, and selenium(5b, 15) it has been found that the mortality rate is higher in animals treated with BAL than in untreated control animals. The mechanism responsible for this phenomenon is not understood.

### *Toxic Effects of BAL*

In human subjects the drug proved to be of relatively low toxicity when employed in the usual therapeutic dosage. Topical application of BAL ointment produced transient local erythema, whealing, and itching in only a small percentage of normal volunteers(18). The drug was given parenterally to 34 volunteers as 10 per cent BAL and 20 per cent benzyl benzoate in peanut oil. It was found that with doses of 3 mg. per kilogram no alarming toxic reactions occurred; when

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13. Gilman, A., *et al.*: The Treatment of Acute Systemic Mercury Poisoning in Experimental Animals with BAL, Thiosorbitol and BAL Glucoside, J. Clin. Investigation 25:549-556 (July) 1946.
14. Longcope, W. T., *et al.*: The Treatment of Acute Mercury Poisoning by BAL, J. Clin. Investigation 25:557-567 (July) 1946.
15. Gilman, A., *et al.*: The Treatment of Acute Cadmium Intoxication in Rabbits with 2,3-Dimercaptopropanol (BAL) and Other Mercaptans, J. Pharmacol. & Exper. Therap. 87:85-101 (Aug.) 1946.
16. Short, C. I., Beckman, W. W., and Bauer, W.: Gold Therapy in Rheumatoid Arthritis, New England J. Med. 235:362-368 (Sept. 12) 1946.
17. (a) Cohen, A., Goldman, J., and Dubbs, A. W.: The Treatment of Acute Gold and Arsenic Poisoning, J.A.M.A. 133: 749-752 (Mar. 15) 1947; (b) Ragan, C. and Boots, R. H.: The Treatment of Gold Dermatitis, Ibid, pp. 752-754; (c) Lockie, L. M., Norcross, B. M., and George, C. W.: Treatment of Two Reactions Due to Gold, Ibid, pp. 754-755.
18. Sulzberger, M. B., *et al.*: Studies on the Toxicity of BAL on Percutaneous and Parenteral Administration, J. Clin. Investigation 25:474-479 (July) 1946.

larger doses (3.6 to 5.5 mg.) were used, toxic manifestations occurred with moderate frequency. These manifestations included nausea, vomiting, headache, a burning sensation of the lips, mouth and throat, a feeling of constriction and sometimes pain in the chest and throat, burning and tingling of the extremities, conjunctivitis, lacrimation, rhinorrhea, salivation, sweating of the forehead and hands, abdominal pain, and general agitation. Local pain at the site of injection and muscle spasm of the leg were quite common. One of the most consistent findings was elevation of the systolic and diastolic blood pressure within about half an hour after the injection. No toxic reactions persisted longer than two hours, except in one patient who noted ill effects for twenty-four hours. After single injections of 8 mg. per kilogram toxic reactions occurred regularly(3,19). No cumulative effect was observed, however, if four hours elapsed between injections.

## *Illustrative Case*

A 39-year-old woman, Para VII, was admitted to the North Carolina Baptist Hospital on October 20, 1946. Her last menstrual period occurred on May 14, 1946. Ten weeks prior to admission a diagnosis of syphilis complicating pregnancy was made by her physician. Intravenous injections of mapharsen were given once weekly, together with drops by mouth. After seven injections an erythematous, scaling patch developed on the dorsum of the right wrist. This lesion spread rapidly to involve both forearms and arms. Following the next injection her entire body "broke out," the trunk being least involved; the process was described as "eczema." She was admitted to a private clinic, where she was given intravenous injections to "drive the arsenic out of her system." Penicillin was also given "up to the limit." After fifteen days of treatment, with no improvement, she was referred to this hospital.

Her past history is of interest only in that she had had pneumonia on several occasions. During the winter of 1945-1946 she had an attack of pneumonia followed by a cough which persisted all winter and was productive of one-half cup of mucopurulent sputum per day. The cough and sputum recurred three days prior to admission to the hospital. There was no previous history of allergic manifestations or drug sensitivity.

### Physical examination

The temperature was 99.6 F., the pulse 126, respiration 22, blood pressure 120 systolic, 68 diastolic. The patient was alert, cooperative, and in obvious distress. The skin of her entire body was erythematous and covered by a scaling, eczematoid process. Edema was marked. Weeping was noted only in the flexural creases, in cracks in the skin, and in the perineum and axillae. The trunk was involved to a much lesser extent. There was a definite loss of hair and eyebrows. Periorbital edema was marked, the eyes being nearly closed. The perineum was fiery red, practically denuded, and weeping profusely. A few rales were audible at the right lung base. A grade 2 systolic murmur was heard at the apex, and the uterus was enlarged to a point 13 cm. above the symphysis.

### Accessory findings

The urine showed 3-5 white blood cells and an occasional red cell per high power field. Blood studies revealed 9.5 Gm. of hemoglobin, 4,750,000 red blood cells, and 24,500 white blood cells, with 70 per cent segmented polymorphonuclear cells, 15 per cent non-segmented, 12 per cent lymphocytes, and 3 per cent monocytes. The icterus index was 3 units, the total serum protein 4.6 Gm. per 100 cc., uric acid 5.2 mg., cholesterol 135 mg., and bilirubin less than 0.8 mg. per 100 cc. A bromsulfalein test showed 40 per cent retention in fifteen minutes, and 2 per cent retention in forty-five minutes. The Kahn and Wassermann reactions were positive, and the quantitative Kahn was 20 units. The sedimentation rate was 28 mm. per hour, corrected. Phenolsulfonphthalein excretion on October 22 was 73 per cent. Urine culture showed no growth.

An electrocardiogram made on October 31 showed sinus tachycardia, but otherwise no evidence of myocardial disease.

### Course in the hospital

Tachycardia continued throughout her stay in the hospital. Apparently it was not associated with the anemia, since it persisted after the anemia had been corrected by repeated transfusions. Because of the rales in the chest and the danger of infection in the denuded skin areas, the administration of penicillin was begun on October 24. On October 25 a supply of BAL was received, and intramuscular injections were started immediately (three weeks after the appearance of rash). One and a half cubic centimeters of a 10 per cent solution were given every four hours for eight doses. On October 27 the frequency of injections was reduced to twice daily, and the drug was continued at this rate for nine days. The patient complained of burning pain at the site of injection, which persisted for two to three hours after each dose; this complaint was partially remedied by anesthetizing the injection site with novocaine in a 1 per cent solution prior to each injection. By October 28 a dramatic reduction of edema was noted, with a loss of 7 pounds of body weight in three days. On November 7 multiple abscesses were seen to be developing at the sites of some of the previous BAL injections. These were incised and drained on November 9, and Staphylococcus albus was cultured from the material obtained.

BAL injections were discontinued on November 11, 1946, after a total dose of 3750 mg. had been given in a period of eleven days. Blood transfusions were continued at periodic intervals, a total of 4000 cc. of citrated blood being given during the period of hospitalization. By November 13 the skin lesions had largely disappeared; there remained only a fine, bran-like scale, without erythema; the hair, however, continued to fall out, and the loss of eyebrows and lashes was practically complete. The hemoglobin by this time had risen to 12 Gm., the red blood cells to 5,000,000. The patient was discharged on November 24; her skin at that time was practically normal, aside from loss of hair.

She was followed in the obstetric outpatient department, where she was seen to be completely free of skin lesions by December 5. A gradual regrowth of hair was noted. She was delivered of an apparently normal, healthy child on February 3, 1947.

## *Discussion of Case*

It is apparent that this case represents a hypochromic anemic reaction as well as a

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19. Modell, W., Gold, H., and Cattell, McK.: Pharmacologic Observations on BAL by Intramuscular Injection in Man, J. Clin. Investigation 25:480-487 (July) 1946.

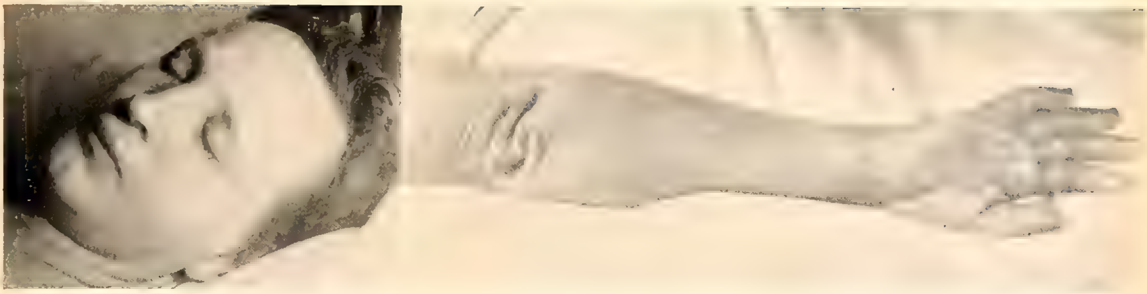

**Fig. 1.** Appearance of the patient on October 27, 1946, two days after the institution of therapy with BAL.

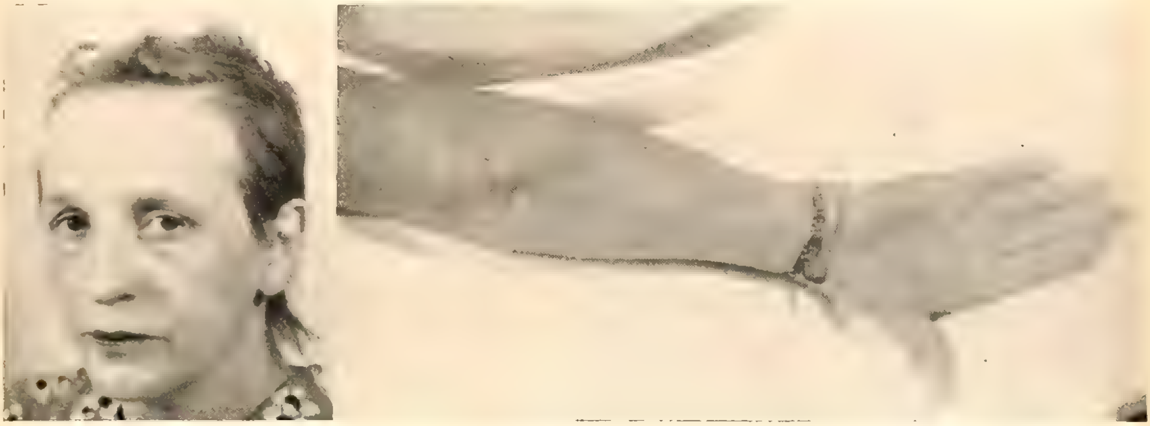

**Fig. 2.** These photographs, taken on January 27, 1947, represent the appearance of the patient when she was seen in the obstetric outpatient department on December 5, 1946.

skin reaction to arsenic. It illustrates the fact that beneficial results can be anticipated from the use of BAL in arsenic poisoning, even when the treatment is instituted late. Three weeks elapsed between the onset of exfoliative dermatitis and the institution of therapy.

The severe pain at the site of injections, with ultimate abscess formation, is apparently an unusual occurrence. It is possible that this might have been avoided by injecting the material deeper in the gluteal muscles.

### *Summary*

1. Arsenic produces intoxication in man and animals by depressing intracellular tissue respiration. It produces this depression by attaching itself to sulfhydryl radicals of enzymes responsible for the metabolism of fats and carbohydrates, thus interfering with the function of these enzyme systems.

2. British Anti-Lewisite (BAL), a dithiol, by supplying more readily available sulfhydryl groups, is able to remove arsenic from the enzyme systems, and thereby reactivate tissue respiration.

3. BAL is a potent antidote for poisoning by arsenic and mercury, and it is probably useful in the treatment of poisoning by bismuth, gold, and antimony. On the basis of animal experiments it would appear that BAL is contraindicated in cases of poisoning by lead and certain other heavy metals.

4. While best results in heavy-metal poisoning are obtained by early treatment with BAL, the compound is effective even in poisoning of long standing.

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**Ingestion of a hearty meal** has long been recognized as a precipitating cause of sudden death in cardiac patients. Many patients notice that they become more dyspneic or have more cardiac distress after meals, especially when eating is associated with aerophagia or the foods are gas-forming. This is partly because cardiac output, arterial pressure, cardiac work and the heart's requirement for oxygen are increased during digestion, particularly of protein food. In part, the distress arises because a full stomach elevates the diaphragm and displaces the heart transversely into a position where it is believed to work less efficiently, at the same time reducing vital capacity and compressing alveoli.—Irvine H. Page and Arthur C. Corcoran: Arterial Hypertension, Chicago, The Year Book Publishers, Inc., 1945, p. 208.

# SPECIAL DISABILITIES IN CHILDREN WITH ORGANIC BRAIN PATHOLOGY

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Sequelae of central nervous system disease or damage, when they are manifested as physical or neurologic disturbances, are more or less obvious. Paralyses, localized weakness, Parkinsonism, involuntary movements, cranial nerve disturbances, and reflex changes can be seen and even measured in some instances. These neurologic findings have been described very adequately in the literature, and it is taken for granted that they are conclusive proof of damage to the central nervous system.

Other sequelae, which may or may not be accompanied by positive neurologic findings, are, for the most part, less tangible and are often referred to as "change of character," "change of personality," or "behavior problem." They include hyperactivity, impulsiveness, aggressiveness, distractibility, and asocial behavior, and occur much more frequently in children than in adults. In this realm, except where intellectual deterioration is present, we have had few definite measuring rods, and the establishment of the observed phenomena as evidence of change in the nervous system has depended in large measure on the observation and interpretation of the examiner.

## *"Organic Drivenness" and "Strephosymbolia"*

More definite observation and interpretation were brought into this field when Kahn and Cohen(1) published their article describing "organic drivenness." Previously Economo, Hauptman, and many others had indicated how changes in the nervous system, especially in the brain stem, such as those produced by encephalitis epidemica, influenced the entire personality. Kahn and Cohen conjectured that there may be individuals who, although defective in brain stem organization, do not betray any other evidence of it except the organic drivenness. In other words, there may be those in whom no definite disease or trauma has occurred, but in whom there is an innate deficiency to account for the organic drivenness.

The original description of the syndrome of organic drivenness was as follows: "(1) A high degree of general hyperkinesis with either choreiform or tic-like (myoclonic) movements in face, trunk and extremities; (2) oustanding difficulty, approaching an almost complete inability in maintaining quiet attitudes (be it only for a few seconds); (3) abruptness and clumsiness in the performance of movements, even of relatively simple ones; (4) an explosive motor release of all voluntarily inhibited activity." The general (hyperactivity) and special (involuntary movements) hyperkinesis stands in the foreground of the picture.

The purpose of this presentation is to add certain psychiatric and psychologic observations concerning the syndrome and to bring more factors into recognition for the diagnosis and treatment of organic brain conditions in children. These additional disabilities that have been observed are very closely related to what Orton(2) has called "strephosymbolia." While there is still disagreement with some of the details of Orton's interpretation of the condition, it must be accepted that some children do have, in varying degrees, difficulties in reading, writing, and speech which are somehow related to mixed dominance or lack of definitely established dominance. It is our contention that sometimes this condition may be truly hereditary as Orton has claimed, but that in other instances it may be the result of some organic change occurring prenatally or postnatally. It is to be remembered that Orton's hypotheses were based on his experience in neuropathology.

## *Case Studies*

Some years ago, in dealing with many young, overactive children who were behavior problems, I began to suspect that in some of them organic changes played a role in the behavior disorder. The suspicion was based on the above mentioned characteristics of "organic drivenness," or on lack of associated movements, or on a vague history of possible organic disorder. The general clinical picture was very similar to that of definitely established postencephalitic syndromes. A few years later, further observation of these patients revealed that they were

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1. Kahn, E. and Cohen, L. H.: Organic Drivenness; A Brain-Stem Syndrome and an Experience, New England J. Med. 210:748-756 (April 5) 1934.

2. Orton, S. T.: Reading, Writing and Speech Problems in Children, New York, W. W. Norton & Co., Inc., 1937.

having difficulties in school progress very similar to those of children who had specific "reading disabilities." This finding led to more detailed psychiatric and psychologic studies of these children which revealed, in addition to other handicaps such as poor motor coordination, the characteristic disabilities responsible for the lack of satisfactory progress in school.

These special disabilities can best be described by case reports. Three records will be presented in detail to illustrate the findings and show the method of study. The remainder of the 30 patients who were studied in the same way cannot be included in this paper. In a few of these cases, there were definite neurologic signs of organic disturbance. In a few others there was a definite history of disorder of the central nervous system, with or without neurologic signs. Others, without a positive history or neurologic findings, had the hyperkinesis, distractibility, and impulsiveness characteristic of organic drivenness, and all revealed the characteristic psychologic findings related to the special disabilities(3).

### *Case 1*

This patient was originally referred for psychiatric consultation at the age of 8 because she was not doing well in school and because of restlessness, disobedience and distractibility.

**History:** The patient was an illegitimate child who had been abandoned on a doorstep, and nothing was known of the family history. She was adopted at the age of 6 months by a childless couple who previously had adopted another girl 4 years older than the patient. This older girl was described as being much prettier and much more intelligent than the patient. The patient had always been the adoptive father's favorite, but he died when she was 8 years old, and the mother had to go to work in order to support the family.

The hospital record showed that the patient's birth was spontaneous, that she was a full-term baby, and that her weight at birth was 7 pounds. The adoptive mother stated that the patient sat up at 8 months, walked at 16 months, and talked at 2 years. The patient had chicken pox and measles at 2½ years, and a severe attack of pertussis, followed by a tonsillectomy, at 3 years.

At the age of 5 years, the patient was admitted to a hospital with the tentative diagnosis of poliomyelitis. This illness occurred during an epidemic of poliomyelitis. The patient had been perfectly well until the day prior to admission, when she complained of feeling tired and of having a pain in her neck. Her temperature was 100 F. and there was some vomiting. In the hospital the only positive findings were left-sided facial weakness and a spinal-fluid cell count of 52. A slight elevation of temperature soon subsided, and after five days the patient was discharged with a diagnosis of polioencephalitis.

During the psychiatric examination the patient was very restless, not sitting still for more than a minute at a time; distractibility was also noted. She was quite frank in all her discussion and stated that reading and spelling were her most difficult school subjects. She also stated that soon after she left the hospital at the age of 5, her right eye turned outward, and she had been forced to wear glasses. The mother stated that the behavior complained of was present before the acute illness, but that it became much more noticeable afterwards.

When seen again at the age of 12½ years, the patient was still very restless and easily distracted. She said that she had run away to New York, hoping to sing over the radio. About her only accomplishment seemed to be her ability to sing, but her mother reported that she had absolutely no sense of rhythm. The patient had taken dancing lessons for a few years, but had made no progress. She was now in the seventh grade; a report from her school indicated that she had not been held back in any grade, but stated that she read with great difficulty and could not spell. The patient said that arithmetic was difficult for her because of the long, involved problems which she had to read and which she could not understand very well. The neurologic examination was negative except for the external strabismus in the right eye.

**Psychologic study:** When this patient was first studied psychologically at the age of 8, she appeared hyperactive, "scatter-brained," and at times completely confused in her hyperresponsiveness and distractibility. She was inclined to patterned gestures that gave a somewhat dramatic suggestion to her behavior. Her fingernails were badly bitten.

The Stanford-Binet test showed her intelligence quotient to be 93; the Healy quotients were 86 and 76, with a characteristic contrast between rote performance with simple associative material and thoughtful comprehension, reasoning, and interpretation. Poor apperception of spatial relationships was marked. In school achievement tests the same characteristics were operative. Work was done quickly, superficially, without due regard to meaning, and with noteworthy evidence of inadequate sensory-motor coordination and form appreciation. The performance quotients were as follows: reading comprehension 99, oral reading 81, spelling 77, arithmetic computation 114. Careful supervision and direction were necessary for maximal performance in these tasks.

Restudied at the age of 12, she showed essentially the same characteristics as before, now expressed in a pathetically inadequate preadolescent personality. She tried to sit quietly and behave in a ladylike way, but her continuous fidgeting and restlessness amounted at times almost to physical excitement, and her anxiously confused behavior made her appear quite silly. She evidently exerted great effort to concentrate, and as a result fatigued easily.

On the Stanford-Binet test, the intelligence quotient again rated 93, in a performance characterized by abilities and defects similar to those shown in the earlier study. Reaction time was unduly quick; comprehension and reasoning were incomplete and inadequate; form relationships were poorly apperceived; and mental function as a whole was insufficiently integrated. Her remarks and formulations contained a mixed hodgepodge of fairly good repetitions of familiar phrases correctly applied and foolish interpretations and conclusions in unfamiliar problems.

The patient's vision, corrected by glasses, was adequate for school work, but fusion was poor and irregular, the right eye continuing to deviate in

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3. The detailed psychologic studies of these patients were made by Dr. Catherine C. Miles of the Department of Psychology, Yale University.

spite of the child's obvious effort to control it. Excessive urge to speed appeared almost compulsive in the Formboard performance, but so poor was the comprehension of the problems and so inadequate the form appreciation that the resultant quotient (95) was not better than the average level of her intelligence.

The tests of school skills revealed the same contrasts. Incapacity for thoughtful comprehension was expressed in the reading tests (quotient 88), whereas the arithmetic calculations (quotient 109) showed a relatively greater capacity for routine exercise with familiar material. The spelling, in which she had been specially tutored, showed improvement (quotient 93), but the poor visual-motor coordination was still characteristically revealed.

This patient's essential organic defect appeared in restless hyperactivity, visual and apperceptive inadequacy, a poor sense of form relationships, and a pervading failure of rational comprehension and synthesis.

### *Case 2*

This patient was admitted to the Psychiatric Clinic at the age of 19 years. He had been a behavior problem since the age of 9, and had been in numerous stealing episodes and other delinquencies.

**History:** The birth was difficult, requiring version and extraction and the use of instruments, but there was no definite evidence of birth injury. The patient seemed to be a healthy, active child, but had temper tantrums, convulsions, and enuresis until he started to school. No further information about the convulsions could be obtained, and apparently they never recurred after about 6 years of age. He walked and talked at an early age and was considered very bright by the parents and neighbors. He had measles, mumps, and scarlet fever in childhood, but there was no history of any complications. He entered school at 6 years of age and made steady progress until, at the age of 9, he received a head injury during a football game. He was unconscious for twenty-four hours, and x-ray revealed a fracture of the skull in the left temporoparietal region. For more than a year after this injury he had periods of somnolence lasting twenty-four hours, and for about two years he complained of blurring of vision.

Following this injury his mother and teachers, for the first time, noted bizarre behavior. His drowsy periods alternated with periods of overactivity and unexplained and uncontrolled fits of anger. His school achievement fell off, and he had to repeat the sixth grade. Ultimately he completed about two years of high school work. While he was in the seventh grade, an older man enticed him into homosexual activities, which were continued for more than a year. From the age of 14 he frequently went on alcoholic and sex escapades with prostitutes. Later he was involved in burglary—stealing automobiles.

At the age of 17 years, he was admitted to the Boston Psychopathic Hospital following his apprehension for the theft of a car. A diagnosis of psychopathic personality was made. He was in the Norwich (Connecticut) State Hospital for six months during the following year. There he was overactive and destructive, used obscene language, and, according to his description, was in wet packs more than once. It was considered that he had a psychosis due to some organic brain disturbance.

In the Psychiatric Clinic his behavior varied markedly, but most of the time he was hyperkinetic. His mood varied between depression and irritability. One feature was the boy's constant query as to why he behaved as he did. The physical examination was negative except for the traumatic cranial asymmetry. There were no positive neurologic findings, and the spinal fluid examination, as well as other laboratory tests, was negative. Encephalography showed symmetrical dilatation of the ventricular system, with incomplete and unsatisfactory visualization of the subarachnoid spaces.

**Psychologic study:** The first psychologic study was done when the patient was 19 years of age. He showed restlessness, fidgetiness, hyperactivity, and explosive behavior. He was boyishly cooperative, irked by school tasks, but rather inclined to enjoy mechanical types of work. His reaction time was quick, and performance tended to be careless and non-critical. He was restless when trying to sit quietly. Although he wrote with his right hand, his two hands had approximately equal strength; his speech was stumbling. Visual acuity, balance, and fusion showed no gross defects. Reasoning was confused; sustained, thoughtful problem-solving was carried out only with great difficulty.

On the Stanford-Binet test the intelligence quotient was 86; on the Otis speed and power tests the corresponding quotients were 80 and 84. Typical of patients with central organic defect was the inability shown in solving difficult problems, either mathematic or of the verbal reasoning type. Typical also was the contrast between his better performance with verbal multiple-choice items, where the answers were available for selection, and his poorer function when he himself had to develop the answer. He had poor verbal facility, and read badly. Quotients on the Healy tests were widely diverse—66 and 115. With quick motions he made a good performance with the Ferguson Formboards (quotient 97), in spite of apparent difficulty in form relationships.

School achievement tests revealed poor perceptive, apperceptive and comprehension ability. Oral reading was definitely better than reading comprehension. The thinking defect shown in reading and arithmetic computation was similar to that in the intelligence test, and pointed to a difficulty in symbolic thinking and in the maintenance of central problem-solving. The patient was not able to hold the various elements of a verbal or arithmetic problem in mind simultaneously and long enough to secure an adequate solution. His defect appeared to be primarily a central defect in thinking and comprehension rather than a technical difficulty in recognizing the visual symbols that formed the words.

His occupational choices were mechanical and adventurous. On mechanical tests he scored in the upper 10 per cent for adults. On the Bernreuter personality inventory he rated as self-conscious, sensitive, insecure, dependent and sociable.

In this patient marked apperceptive disability was combined with an essential defect in comprehension and in sustained mental elaboration to present a picture of profound organic impairment.

### *Case 3*

This patient was first referred for psychiatric consultation when he was 10 years of age. He was referred by school authorities because of scholastic difficulties, especially in reading and visual motor functions, and because for three years he had been a classroom problem, showing lack of motor control. Three years later he was studied again in the psychiatric hospital because he had continued to be a behavior problem and because there was a question of endocrine imbalance.

**History:** The family were in comfortable financial circumstances and the family history showed nothing remarkable. The patient was the oldest child, having one sister and one brother, who were considered to be quite normal. The patient's birth was spontaneous and normal, the birth weight being 10 pounds. He sat alone at 6 months, talked at one year, and walked at 16 months.

At the age of 2 the patient had a serious illness, ushered in by several convulsions. Further information about this illness could not be obtained, except for the fact that a short time after recovery strabismus was noted. At the age of 4 he had chronic suppurative otitis media, but there was no evidence of mastoiditis. At that time it was found that the left testicle was undescended, and several years later an operation was performed for this condition. When he was 9 years old slight impairment of hearing was found, and an ophthalmologist thought that he had double vision and noted that he read some letters backwards. The history revealed that the parents had changed the patient from left-handedness to right-handedness. At the age of 10 unusually rapid growth began, and when he was 14 years of age he was 6 feet, 3 inches tall and weighed 168 pounds.

The patient spent a year in kindergarten and entered the first grade when he was a little over 6 years of age. Because his family took frequent winter trips, he missed considerable time from school and had to repeat the third grade. The teacher reported that he was poorly coordinated and was backward in reading. For some time he was in a private school, where clumsiness and lack of interest were noted from time to time. Finally he was expelled from the seventh grade of this school when he was almost 14 because he had been fighting, annoying girls, and misbehaving generally. When he was 15 years old and attending public high school, he was found in suspicious places and in questionable sexual activity. Uninhibited sexual behavior was reported from many sources, but so far as could be established there was no definite intercourse.

In the psychiatric hospital the patient was considered to have slightly accelerated motor activity, and it was noted that he fatigued easily. On the hospital ward he was talkative and bragging. He annoyed all females by bumping into them, poking them, and making suggestive remarks. Physical and neurologic examinations were negative. X-ray of the skull, the usual laboratory tests, and many additional studies for evidence of endocrine imbalance were entirely negative.

**Psychologic study:** The patient was first studied psychologicaly when he was 9 years and 9 months of age. He was well developed, but showed poor motor coordination, with large, jerky contractions of the trunk and limb muscles. His motor reactions were generally slow and rather irregular, but he was continuously active. His left hand and left foot showed greater irregularity in movement than did the right hand and foot. His rate of walking was irregular; a jerky swaying of the body occurred, and his manner of placing the feet was unusual and awkward. Loud sounds caused considerable reaction of the musculature. He talked continuously and without social restraint, making many absurd comments. He was inclined to joke about his faults and errors.

The Stanford-Binet test showed an intelligence quotient of 93; fluent speech, easy verbal association, quick superficial rote memory, and imaginative elaboration contributed the more favorable elements. Where motor control was essential, or where visual apperceptive material was to be reproduced, the work was poor.

School achievement was definitely retarded at this time. The patient's quotient in word meaning was 71, in spelling 70, in arithmetic computation 67. Attention was diffuse and difficult to hold. He showed very little idea regarding desirable procedures and guessed rather than thought out his answers. He spelled words out loud before writing them, and his oral spelling not infrequently proved more accurate than what he wrote down.

More than a year later, when he was 11, he was given a second psychologic study. Again he showed effort, but poor mental organization for accomplishment. As before, he was right-handed and left-eyed, and motor coordination appeared to be poor. On the Stanford-Binet test the quotient was 85 in a performance qualitatively similar to that described in the previous year. Form relationships were especially poorly rendered. This defect was demonstrated also in the Ferguson Formboards, where the quotient was 65.

Having been tutored in the interim in his reading, the patient was able to score 93 in paragraph meaning, although his spelling quotient was still relatively low (75). The writing showed poor comprehension of pronunciation and sound values.

When he was seen again at the age of 14 years and 8 months, the patient's mental age on the Stanford-Binet test rated 10 years, 4 months, and his intelligence quotient was 72, showing only twelve months' development in almost four years. The two most conspicuous difficulties in the intelligence function at this time were associated with sensory-motor coordination and the comprehension and organization of thoughts verbally expressed. He tried very hard to succeed in problems involving these elements, with singularly poor results in relation to the amount of effort expended. With the Formboards, performance was little better than it had been four years before; his quotient was 66. Extreme clumsiness and a low rate of speed combined with poor appreciation of spatial relationships to make this performance extremely unsuccessful.

In school achievement tests his quotients were 86 in reading comprehension, 75 in arithmetic computation, 74 in spelling. The oral reading was fast and careless (quotient 78). The vision was corrected with glasses and acuity was fully adequate, although fusion may have been somewhat below average. The patient continued to be right-handed and left-eyed. His behavior, as before, often seemed silly and childish. Always pleasant and agreeable, he continued to make a great many irrelevant jokes and foolish excuses.

The persisting defect in the appreciation of form relationships and the relatively poor quality of comprehension and verbal elaboration were the two chief evidences of central organic disability in this patient. The clumsy hyperactivity and jerky muscular coordination gave further indication of organic drivenness.

## *Discussion of Cases*

Concerning the special disabilities found in these patients, certain general psychologic facts should be pointed out. In all learning, apperception is essentially necessary, and much school learning, especially in the lower grades, depends on the acquisition of series of forms, especially as digits, letters, or words, which offer peculiar difficulty to the organically impaired. Learning further depends on the capacity to sustain, classify, and organize the materials acquired, and creative thinking involves reorganization and the bringing together of new associates from the mental foreground and background.

For the organically impaired this activity is profoundly hampered and limited. The degree of limitation no doubt depends upon the degree of pathology, although many other circumstances and factors enter in. The adequacy of motivation, stimulation, and instruction from without, and the degree of fluctuating attention and distractibility from within influence the extent to which more or less defective individuals may learn. The hyperactivity and the compulsive devotion of some organically defective individuals to certain types of learning are compensatory. So also is the facility for the acquisition of meaningless but rhythmic materials. Organically defective individuals may be more facile than the average in the rendering of clang association materials, but this is not really learning. For adequate retention, comprehension is prerequisite, and for comprehension sustained thinking is essential.

In the presentation of these cases the cooperation and collaboration of psychiatrist and psychologist have been stressed. The psychiatrist observed the difficulty in school progress in certain subjects, the evidence of confused dominance, and the hyperactivity and distractibility, resembling in some aspects the behavior of many children with the so-called reading disabilities. Observed in this group, however, were involuntary movements, lack of associated movements, other neurologic signs, and peculiarities of behavior that gave a stamp of organic disturbance to the cases. The psychologist, noting, in addition to scholastic difficulties, the attention disorders and confused dominance, the unevenness on the psychologic tests, the difficulty in sustained central elaboration, the disturbances of sensory-motor coordination, the difficulty in symbolic thinking, and the slowing down in one or more mental functions, differentiated this group from others as showing evidence of some disorder of the central nervous system.

No attempt is being made at the present time to localize the pathology responsible for these findings, but it is thought that a recognition of these findings will help in the understanding and treatment of children with organic brain disturbances. In addition, our observations bring up other pertinent questions: Will further study of such cases throw additional light on the causation of special disabilities such as strephosymbolia; and will the behavior of childen with special disabilities be understood as secondary to a certain degree to the fundamental organic disorder?

### *Summary*

The correlated psychiatric and psychologic studies of a small number of children with organic brain disorders have been presented. The deviation in behavior and performance and the presence of certain specific disabilities have been pointed out as aids in diagnosis, even when neurologic findings may be absent.

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# BASIS FOR THERAPY IN SHOCK

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**I. Types of shock**
  **A. Hemorrhagic hypotensive shock**
  **B. Traumatic shock**
**II. Cardiac output in shock**
  **A. Alterations in output seen in shock**
  **B. Cause of reduction of cardiac output in true or irreversible shock**
    **1. Heart failure**
    **2. Failure of venous return**
      **a. Increase of capillary permeability as a cause of decreased venous return**
      **b. Lessening of extravascular support as a cause of the decreased cardiac output**
      **c. Vascular stasis as a cause of reduction of cardiac output**
    **3. Toxemia as a factor in the reduction of cardiac output in traumatic shock**
**III. Therapy**
  **A. Restoration of blood volume**
  **B. Vasoconstrictor substances**
  **C. Anesthesia**
  **D. Environmental temperature**

The clinical manifestations of the shock state are, first, apprehension, and later, apathy, depressed reflexes and sensation, and decreased arterial pressure. The pulse is narrow and rapid; the skin pale, cold, and sweaty; the respiration rapid and shallow. Nausea and vomiting are occasionally present. Blood analyses show a decrease in the bicarbonate ion concentration, and subnormal venous blood oxygen. A tremendous mass of experimental work has been performed on the problems of shock. From this it is evident that the above picture of shock can be produced either by hemorrhage or by trauma.

## *Types of Shock*

### *Hemorrhagic hypotensive shock*

Many of the signs and symptoms of shock appear in experimental animals when they

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are bled to the extent of 30 to 50 milliliters per kilogram of body weight. The mean arterial pressure is thus lowered to around 50 mm. of mercury, and the cardiac output decreased to 30 to 50 per cent of normal(1). After one such hemorrhage the arterial pressure may gradually return to normal, even if no therapy is given. All the animals will recover if the withdrawn blood is returned within fifteen to thirty minutes after the hemorrhage.

If, however, the animals are kept in a severely hypotensive state for one or more hours by the withdrawal of additional small amounts of blood, the decline in arterial pressure will eventually become irreversible. Such animals will usually die in two to ten hours, even if all of the previously withdrawn blood is reinfused. (See figure 1.)

The symptoms and signs demonstrated by the animal during this secondary phase of hypotension are, so far as we are aware, identical with those seen during the initial phase of hypotension which immediately followed the first hemorrhage. Many investigators refer to both forms of hypotension as "shock." I prefer to designate the initial stage of lowered arterial pressure due to hemorrhage as simple hypotension, and to restrict the term "shock" to the second phase of hypotension, in which the arterial pressure tends to decline despite the infusion of blood(1a). Wiggers(2) designates this second phase as "irreversible shock." It is apparent that this stage of true or irreversible shock results from secondary changes induced by the preceding period of hypotension and inadequate circulation.

*Traumatic shock*

Trauma has been induced experimentally in the anesthetized animal by numerous methods. Those which induce shock most consistently are methods which produce temporary ischemia of the hind extremities —the application of tourniquets for a period of four to six hours(3), and ischemic compression for four to six hours by a continuous spiral of tightly drawn rubber tubing wrapping the hind legs from ankle to groin(4). These methods have been shown to produce marked chemical and structural disintegration of the ischemic tissue(5).

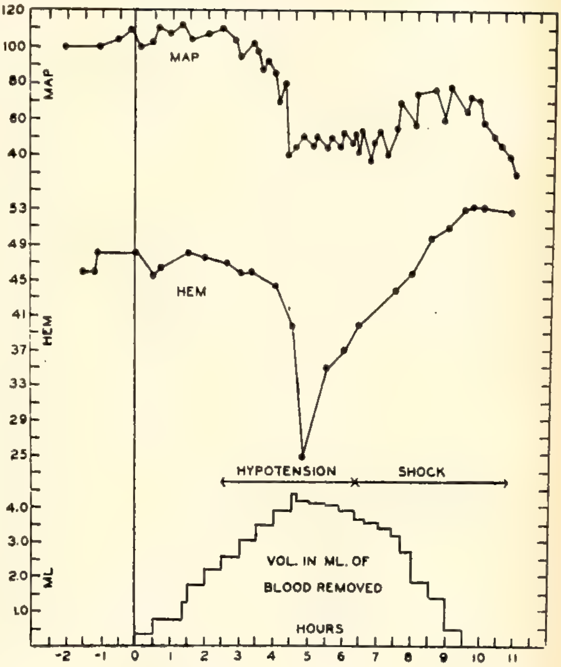

**Fig. 1. Hemorrhagic hypotensive shock.** The top curve (MAP) is mean arterial pressure; the scale at left is in millimeters of mercury. The middle curve (HEM) is hematocrit (ratio of volume of red cells to blood volume x 100). The graph at the bottom shows the volume of blood removed (upward deflection) and the volume returned (downward deflection) in milliliters per 100 Gm. of body weight. Note: hemorrhage was begun at zero time. Reinfusion of the blood was begun four hours and forty minutes later, and all the previously withdrawn blood had been returned nine hours and thirty minutes after the start of the hemorrhage.

When the circulation is restored after such a six-hour period of ischemic compression the arterial pressure usually falls rapidly. Associated with this fall there is a rapid accumulation of fluid in the traumatized legs(4b). (See figure 2.) The arterial pressure may then remain stabilized for some hours, or may continue to decline. During this period there is little further increase in the

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1. (a) Green, H. D.: Shock, Anesthesiology 3:611-629 (Nov.) 1942; (b) Werle, J. M., Cosby, R. S., and Wiggers, C. J.: Observations on Hemorrhagic Hypotension and Hemorrhagic Shock, Am. J. Physiol. 136:401-420 (May) 1942; (c) Wiggers, H. C. and Middleton, S.: Cardiac Output and Total Peripheral Resistance in Post-Hemorrhagic Hypotension and Shock, Am. J. Physiol. 140:677-687 (Feb.) 1944.
2. Wiggers, C. J.: Recent Studies on the Irreversibility Characteristic of Shock, Exp. Med. & Surg. 1:2-13 (Feb.) 1943.
3. Allen, F. M.: Physical and Toxic Factors in Shock, Arch. Surg. 38:155-180 (Jan.) 1939.
4. (a) Eggleton, M. G., Richardson, K. C., Schild, H. O., and Winton, F. R.: Renal Damage Due to Crush Injury and Ischaemia of Limbs of Anaesthetized Dog, Quart. J. Exper. Physiol. 32:89-106 (May) 1943; (b) Green, H. D., Dworkin, R. M., Antos, R. J., and Bergeron, G. A.: Ischemic Compression Shock with an Analysis of Local Fluid Loss, Am. J. Physiol. 142:494-507 (Nov.) 1944. (References to earlier work on traumatic and hemorrhagic shock are summarized in this paper.)
5. Green, H. D., Bergeron, G. A., Little, J. M., and Hawkins, J. E., Jr.: Evidence from Crosstransfusion Experiments that No Toxic Factor Is Present in Ischemic Compression Shock Capable of Inducing a Shock State in Normal Dogs, Am. J. Physiol., in press.

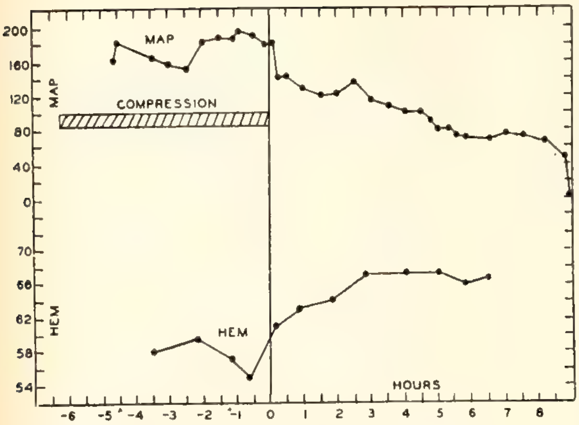

**Fig. 2. Traumatic shock.** The bar labeled "compression" indicates interval of time during which hind legs were compressed and rendered ischemic by rubber tubes wrapped about the legs. Zero time marks the end of the period of trauma (release of the compression). MAP and HEM have the same significance as in figure 1.

local edema of the traumatized tissues(6). Within two to ten or more hours after release of the compression the arterial pressure again begins to decline rapidly, and death occurs within one to two hours. Infusions of blood or other fluid may cause a permanent restoration of arterial pressure, but the animal often dies even when it receives amounts of blood which are more than equal to the volume of edema in the traumatized tissues. It seems reasonable to infer that in such animals a stage of true or irreversible shock has developed(7).

## *Cardiac Output in Shock*

### *Alterations in output seen in shock*

A decrease in cardiac output has been observed in the period of early hypotension produced by hemorrhage or trauma. Reduced output is also seen in the true or irreversible stage of shock which follows prolonged hypotension, even when the arterial pressure has been temporarily restored by infusions. It has been shown that the decrease in cardiac output precedes and, in fact, causes the decline in the arterial pressure(8). The severity of the symptoms is more closely related to the degree of impairment of cardiac output than to the level of the arterial pressure. All of the signs and symptoms of shock can be explained either by the reduction in cardiac output or by the compensatory cardiac acceleration and vasoconstriction.

The reduction in cardiac output following hemorrhage can readily be explained as being due to an inadequate return of blood to the heart, with resultant decreased filling of the central venous reservoir. The impairment of cardiac output seen in the stage of true or irreversible shock, even when blood has been given in sufficient quantity to restore the blood volume, requires further explanation.

### *Cause of reduction of cardiac output in true or irreversible shock*

Reduction of cardiac output can be due to only two factors: (a) reduction in the amount of blood ejected by the heart, in which case the central venous pressure will rise, or (b) reduction in the amount of blood supplied to the heart (decreased venous return).

*Heart failure.* The reduced cardiac output seen in true shock has been blamed in part upon the development of myocardial failure by Kohlstaedt and Page(9) and by Wiggers(10), who have observed a slight terminal rise in the central venous pressure in experimental hemorrhagic shock. Other investigators, however, have found the central venous reservoir pressure to be consistently below normal(8d). It is unlikely, therefore, that cardiac failure plays more than a minor contributory role.

*Failure of venous return.* Inadequate venous return is practically always due to the fact that the blood volume is too small in relation to the capacity of the vascular system. This disproportion can be due: (1) to loss of blood by hemorrhage; (2) to loss of plasma by leakage through the walls of capillaries which have become excessively permeable to the blood proteins; and (3) to stasis of blood caused by an increase in the

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6. Scott, C. C.: Failure of Local Fluid Loss to Account for Death in Experimental Shock, J. Clin. Investigation 25: 153-157 (March) 1946.
7. Fine, J., Frank, H. A., and Seligman, A. M.: Traumatic Shock; Studies in the Therapy and Hemodynamics of Tourniquet Shock, J. Clin. Investigation 23:731-741 (Sept.) 1944.
8. (a) Johnson, G. S., and Blalock, A.: Experimental Shock; A Study of the Effects of Hemorrhage, of Trauma to Muscles, of Trauma to the Intestines, of Burns and of Histamine on the Cardiac Output and on the Blood Pressure of Dogs, Arch. Surg. 23:855-863 (Nov.) 1931; (b) Price, P. B., Hanlon, C. R., Longmire, W. P., and Metcalf, W.: Experimental Shock: Effects of Acute Hemorrhage in Healthy Dogs, Bull. Johns Hopkins Hosp. 69:327-362 (Oct.) 1941; (c) Blalock, A.: Mechanism and Treatment of Experimental Shock: Shock Following Hemorrhage, Arch. Surg. 15:762-798 (Nov.) 1927; (d) Cournand, A., et al.: Studies of the Circulation in Clinical Shock, Surgery 13:964-995 (June) 1943.
9. Kohlstaedt, K. G., and Page, I. H.: Terminal Hemorrhagic Shock; Circulatory Dynamics, Recognition and Treatment, Surgery 16:430-465 (Sept.) 1944.
10. Wiggers, C. J.: The Failure of Transfusions in Irreversible Hemorrhagic Shock, Am. J. Physiol. 144:91-101 (June) 1945.

capacity of the vascular system. The last cause can be due to loss of tone of the blood vessels, particularly the capillaries and venules, and to loss of the normal extravascular support provided by the tone of the skeletal muscles.

A few years ago the theory commonly held to explain the decreased cardiac output was that *capillary permeability is increased.* Moon, one of the principal present exponents of this theory, believes that toxins released from traumatized tissue are responsible for increasing the capillary permeability(11).

If capillary permeability is increased throughout the body in true shock, the hematocrit (ratio of volume of red cells to blood volume) should increase progressively and should rise rapidly as death approaches. A progressive increase of hematocrit is seen in patients with severe burns and accompanies the loss of serum from the raw burned surface. Some increase in the hematocrit occurs following the infusion of blood in hemorrhagic shock, but the readings reach a plateau within an hour or two and undergo no further rise, even during the terminal decline in arterial pressure. (See figure 1.) Similarly, in traumatic shock, the hematocrit rises rapidly at first while plasma is being lost into the traumatized tissue. The value usually reaches a plateau within one to two hours, however, and thereafter remains relatively stable. (See figure 2.)

Since the dye T 1824, used in measuring plasma volume, attaches itself to protein, this dye should disappear from the circulation more rapidly if capillary permeability is increased. All the evidence to date indicates that the rate of disappearance of this dye remains unchanged as true shock develops(12).

Cope and Moore(13) observed that radioactive bromine, injected intravenously into normal animals, appeared within five minutes in lymph collected from the leg, and within twenty minutes was present in the same concentration as in the blood. Radioactive protein, on the other hand, appeared very slowly in the lymph, and the concentration never reached that of the blood. These results were similar to those noted when lymph was collected from non-traumatized tissues of an animal in shock. Lymph from a *burned* leg, on the other hand, contained protein and bromine in concentrations equal to those in the blood. These results indicate that in shock caused by burns the permeability of capillaries to protein is not increased, except at the actual site of the trauma.

Fine, Seligman, and Frank(14) injected radioactive proteins intravenously into animals, then exsanguinated them and measured the total radioactivity of various tissues. The residual blood content in the tissues was computed from their hemoglobin content. The amount of extravascular protein present was then estimated by subtracting the radioactivity attributable to the residual blood from the total radioactivity of the tissues. Comparison of such studies on normal dogs and dogs in shock due to hemorrhage, burns, or trauma showed that the amount of blood in the capillaries was frequently increased in shock. Little or no increase was seen in the amount of protein in the *extravascular* fluids, however, except at the actual site of trauma.

From the above studies it appears fairly conclusive that in true or irreversible shock death may occur even when enough blood or plasma is given to produce a plethora. It is also apparent that the decrease in cardiac output responsible for the lowered arterial pressure is not due to a generalized leakage of plasma from the capillary bed into the extravascular space.

Henderson(15) first postulated that hyperventilation, by lowering the carbon dioxide content of the blood, lessened the skeletal muscular tension and consequently caused a *loss of extravascular tone.* This hypothesis has been investigated by several techniques(16). The consensus of these studies is that loss of muscular tone plays a minimal part in unanesthetized subjects who are free to move their extremities. It may, however, be important in anesthetized, unconscious, or immobile subjects.

Direct evidence of the occurrence of *vascular stasis* in shock has been obtained by

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11. Moon, V. H.: Shock: Its Dynamics, Occurrence, and Management, Philadelphia, Lea and Febiger, 1942.
12. Gregersen, M. I.: Shock, Ann. Rev. Physiol. 8:335-354, 1946.
13. Cope, O., and Moore, F. D.: Study of Capillary Permeability in Experimental Burns and Burn Shock Using Radioactive Dyes in Blood and Lymph, J. Clin. Investigation 23:241-257 (March) 1944.
14. (a) Fine, J., and Seligman, A. M.: Traumatic Shock; An Experimental Study Including Evidence against the Capillary Leakage Hypothesis, Ann. Surg. 118:238-255 (Aug.) 1943; (b) Fine, J., and Seligman, A. M.: Traumatic Shock; Study of Problem of "Lost Plasma" in Hemorrhagic, Tourniquet, and Burn Shock by Use of Radioactive Iodo-Plasma Protein, J. Clin. Investigation 23:720-730 (Sept.) 1944.
15. Henderson, Y., et al.: Acapnia and Shock; Carbon-Dioxide as a Factor in the Regulation of the Heart Rate, Am. J. Physiol. 21:126-156, 1908.

Chambers, Zweifach, and their collaborators(17). They found that, immediately following a decrease in the circulating blood volume, whether by hemorrhage or by loss of fluid into a traumatized leg, there is a period of: (a) constriction of large arteries and veins; (b) increase in the vasomotion of the meta-arterioles controlling the blood flow in the precapillaries, which results in relatively longer periods of constriction and dilatation; (c) constriction of the precapillary sphincters, resulting in complete closure of the collateral capillaries; and (d) increase in the activity of the meta-arterioles in response to topically applied epinephrine.

After *prolonged* periods of hypotension due either to hemorrhage or to trauma these reactions change so that the meta-arterioles cease to show vasomotion and remain dilated; the precapillary sphincters dilate; the meta-arterioles cease to react to topically applied epinephrine; the large arteries and veins remain constricted; and backflow from the veins into the venules and capillaries results in very definite stasis and pooling of blood. However, the volume of blood in the capillaries may be no greater than that seen under normal circumstances of activity. Somewhat similar changes were reported by Page and Abell(18), although they had not been described by earlier observers(19).

On the basis of the observations recorded above, it is apparent that *pooling and stagnation of the blood, resulting from an increase in vascular capacity, are the principal cause of the reduced cardiac output in true or irreversible shock.*

*Toxemia as a factor in the reduction of cardiac output in traumatic shock.* A most important consideration in the treatment of traumatic shock is the part played by *circulating toxins*, particularly those which might be released from traumatized tissues, in the development of capillary stasis and reduced cardiac output.

One method for determining whether or not a toxic factor operates in traumatic shock is to see whether the amount of fluid lost into the traumatized tissue is any less than the amount of blood which has to be removed by hemorrhage to produce a similar degree of shock. The magnitude of the local edema has been computed by traumatizing one extremity or one part of the body, then hemisecting the animal and determining the excess of weight on the traumatized side. The local edema has also been estimated by comparing the leg volume before trauma with that at the time of death, the leg volumes being determined by immersing the extremity in a jar filled with water and measuring the volume of water displaced(4b).

In various experiments using these methods the volume of local edema found in traumatized tissues of animals dying of traumatic and burn shock varied from 0 to 61 milliliters per kilogram of body weight. The averages in eight groups of experiments(4b,20) varied from 27 to 40 milliliters, and the mean of the averages is 34 milliliters. When this amount of fluid is distributed over two extremities, it causes less than a 30 per cent increase in the volume of each extremity.

The volume of blood which had to be removed from animals under similar conditions in order to lower their arterial pressure to levels which, if maintained, would lead to hemorrhagic hypotensive shock (around 50 mm. of mercury) has been re-

16. (a) Kiely, W. F., Hamilton, S. L., and Gellhorn, E.: The Influence of Hemorrhage on Skeletal Muscle Tone, Am. J. Physiol. 137:251-255 (Sept.) 1942; (b) Gunther, L., Henstell, H. H., and John. E.: Intramuscular Pressure during Life and after Death, Am. J. Physiol. 139:161-170 (May) 1943; (c) Gunther, L. and Meeker, W. R.: The Effect of Human Plasma on the Venopressor Mechanism, Am. J. Physiol. 141:102-108 (March) 1944; (d) Henstell, H. H., and Gunther, L.: Comparative Results of Reduction of Plasma Volume, Intramuscular Pressure and Venous Pressure in Surgical Shock, Am. J. M. Sc. 209:187-199 (Feb.) 1945; (e) Opdyke, D. F. and Bergeron, G. A.: Muscle Tonus as Factor in Hemorrhage and Shock in Dogs Under Barbital Anesthesia, Am. J. Physiol. 143:119-121 (Jan.) 1945; (f) Kleinberg, W., Swingle, W. W., and Hays, H. W.: Intramuscular Pressure Changes in Shock, Am. J. Physiol. 143:89-96 (Jan.) 1945.
17. (a) Chambers, R., Zweifach, B. W., and Lowenstein, B. E.: Circulatory Reactions of Rats Traumatized in the Noble-Collip Drum, Am. J. Physiol. 139:123-128 (May) 1943; (b) Zweifach, B. W., Lee, R. E., Hyman, C., and Chambers, R.: Omental Circulation in Morphinized Dogs Subjected to Graded Hemorrhage, Ann. Surg. 120:232-250 (Aug.) 1944; (c) Chambers, R., Zweifach, B. W., and Lowenstein, B. E.: Peripheral Circulation during Tourniquet Shock Syndrome in Rat, Ann. Surg. 120:791-802 (Nov.) 1944.
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19. (a) Root, G. T., and Mann, F. C.: An Experimental Study of Shock with Special Reference to Its Effect on the Capillary Bed, Surgery 12:861-877 (Dec.) 1942; (b) Levinson, J. P., and Essex, H. E.: Effect of Shock on Small Blood Vessels of the Ear of the Rabbit, Proc. Soc. Exper. Biol. & Med. 52:361-362 (April) 1943.
20. (a) Manery, J. F., and Solandt, D. Y.: Studies in Experimental Traumatic Shock with Particular Reference to Plasma Potassium Changes, Am. J. Physiol. 138:499-511 (Feb.) 1943; (b) Green, H. D. and Bergeron, G. A.: Effects of Environmental Temperature on the Traumatic Shock Produced by Ischemic Compression of the Extremities, Surgery 17:404-412 (March) 1945; (c) Lipton, E. L., Denison, A. B., and Green, H. D.: Influence of Body Temperature and of Temperature of Traumatized Tissues upon Local Edema and Survival of Dogs Subjected to Ischemic Compression Trauma of Their Hind Extremities, Fed. Proc., in press; (d) Antos, R. J., Dworkin, R. M., and Green, H. D.: Shock Associated with Deep Muscle Burns, Proc. Soc. Exper. Biol. & Med. 57:11-13 (Oct.) 1944.

corded by six groups of investigators(1b,4b,21). In the individual experiments the amount of hemorrhage varied from 24 to 64 milliliters per kilogram of body weight. The averages in the six groups varied from 43 to 51 milliliters, and the mean of the averages is 48 milliliters. From these figures we may conclude that the volume of local edema in traumatized tissues is slightly less than the volume of blood which must be removed by hemorrhage to produce a comparable state of shock.

Wang, Overman, Root, and Gregersen(22) subjected one group of animals to light pounding of the hind extremities. Another group was subjected to hemorrhagic hypotensive shock. The residual blood volume in dogs dying of hemorrhage was found to be about 57 milliliters per kilogram, whereas in those dying of traumatic shock it was around 71 milliliters per kilogram. They concluded that other factors in addition to the reduction of blood volume are involved in shock.

Shorr, Zweifach, and Furchgott(23) observed that a substance is produced in muscle slices incubated anaerobically, which, when applied locally to capillaries being observed microscopically, induces reactions similar to those seen in hemorrhagic and traumatic shock. They also believe that a similar substance is released from anoxic liver and have designated it "vasodepressor material" (VDM). Numerous other investigators have attempted to prepare extracts from traumatized tissues without clear-cut success(24). More direct evidence concerning the operation of a toxic factor has been provided by various forms of cross-transfusion studies. In most of the negative experiments, however, the volume of blood cross-transfused was too small, and in most of the positive experiments care was not taken to prevent the test dog from losing blood by bleeding into the traumatized dog(5).

In a series of carefully controlled experiments Green, Bergeron, Little, and Hawkins(5) demonstrated that even when very large volumes of blood, 0.5 to 5 times the body weight of the test dog, were cross-transfused between a traumatized dog and a test dog(25), no deaths or alterations in arterial pressure or in appearance of the test dogs were observed which could be attributed to the exchange of a toxic factor. This was the case when all of the blood returning from the traumatized legs, by way of the inferior vena cava, passed through the test dog before eventually returning to the traumatized dog. All of the traumatized dogs died. It was concluded from these experiments that no toxic substance appears in the blood-stream of traumatized dogs which is capable of inducing a significant decline of arterial pressure or of causing death in a normal dog.

It was observed in the course of the above experiments that the renal function of the traumatized dogs ceased shortly after removal of the ischemic compression tube from the hind legs. On the other hand, the renal function of the test dogs remained unaffected. In view of this finding, we considered it possible that the kidney of the test dogs might have been excreting the hypothetical toxic factor. Therefore, in one series of experiments, the urine of the test dog was continuously reinfused into the test dog during the period of cross-transfusion with the traumatized dog. In another series the urine of the test dog was infused into a second test dog. In neither series was evidence obtained which would suggest that a toxic factor was being excreted by the kidney of the test animal(26). The above cross-transfusion experiments thus demonstrate the absence of any significant toxic factor in traumatic shock.

Shorr, Zweifach, and Furchgott(23) have postulated that the kidney counteracts shock by releasing a vaso-excitor material (VEM). We have tested this theory by comparing the period of survival and the course of arterial pressure in traumatized, nephrectomized dogs with those in traumatized, non-nephrectomized dogs. The theory has also been tested by cross-transfusing a traumatized

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21. (a) Huizenga, K. A., Brofman, B. L. and Wiggers, C. J.: The Ineffectiveness of Adrenal Cortex Extracts in Standardized Hemorrhagic Shock, J. Pharmacol. & Exper. Therap. 78:139-153 (June) 1943; (b) Wiggers, H. C., Ingraham, R. C., and Dille, J.: Hemorrhagic-Hypotension Shock in Locally Anesthetized Dogs, Am. J. Physiol. 143: 126-133 (Jan.) 1945; (c) Walcott, W. W.: Blood Volume in Experimental Hemorrhagic Shock, Am. J. Physiol. 143: 254-261 (Feb.) 1945.
22. Wang, S. C., Overman, R. R., Root, W. S., and Gregersen, M. I.: Relation of the Blood Volume Reduction to the Mortality Rates in Experimental Traumatic and Hemorrhagic Shock, Fed. Proc. 4:75 (March) 1945.
23. Shorr, E., Zweifach, B. W., Furchgott, R. F.: On the Occurrence, Sites, and Modes of Origin and Destruction, of Principles Affecting the Compensatory Vascular Mechanisms in Experimental Shock, Science 102:489-498 (Nov. 16) 1945.
24. Toxic Factors in Shock, Editorial, J.A.M.A. 123:485 (Oct. 23) 1943.
25. Denison, A. B., and Green, H. D.: Apparatus for Continuous Cross-Transfusion or for Continuous Mean Blood Flow Measurement, Rev. Scient. Instruments 16:95-97 (April) 1945.
26. Green, H. D., Little, J. M., and Hawkins, J. E., Jr.: Further Observations on the Toxic Factor in Ischemic Compression Shock, Fed. Proc. 5:36 (Feb.) 1946.

dog with a nephrectomized test dog. The behavior and survival of the latter were compared with those of dogs in control experiments in which pairs of nephrectomized test dogs were cross-transfused with each other. In neither series was any significant difference noted between the experimental and the control groups. We concluded from these experiments that the kidney plays at most a minor role in the resistance of the body to shock(27).

*Summary.* It is apparent from the above analyses that the principal initiating factor in both hemorrhagic and traumatic shock is a decrease in blood volume, either by hemorrhage or by extravasation of blood or plasma, or both, directly into traumatized tissues or through burned skin. A reduction of blood volume by 30 to 50 milliliters per kilogram of body weight (2100 to 3500 milliliters for a 70-kilogram man) is a critical loss. Such a loss reduces the cardiac output by 50 per cent or more and induces tissue anoxia, which ultimately causes the development of capillary stasis and the further reduction of cardiac output characteristic of true shock. The greater the reduction of cardiac output and the more prolonged the initial period of reduced cardiac output, the more severe the subsequent shock. If any other factors, such as the release of toxic products from damaged tissue, contribute to the development of true shock, they must play minimal roles.

## *Therapy*

### *Restoration of blood volume*

In view of the above conclusions it is apparent that the single most important objective of therapy is prevention of the decrease in blood volume. In the case of trauma to an extremity this objective may be accomplished by the use of tourniquets only if the extremity is to be subsequently sacrificed. Prolonged ischemia should otherwise be avoided, not only because of the resulting tissue necrosis, but also because of the fact that shock may actually be induced upon release of the tourniquet.

When loss of blood or plasma cannot be prevented, it is essential to restore the blood volume and to return cardiac output as nearly as possible to normal *before* true shock has become severe. Ideally this objective should be accomplished by transfusion of blood or plasma, or both, depending upon which has been lost. The hematocrit serves as a useful guide to indicate the relative amounts of each which are needed, but is of little use in determining the total amounts needed, unless one is certain that no extravascular loss of red cells has occurred. Recent studies suggest that transfusions are most effective when given intra-arterially(28e).

The level of the arterial pressure is an unsatisfactory guide to the volume of replacement fluids needed. Because of compensatory vasoconstriction, cardiac output may be 30 per cent or more below normal, even after the arterial pressure is restored to normal. The circulatory index (pulse pressure times heart rate) is probably a better measure of cardiac output than is the arterial pressure.

In the absence of blood or plasma, saline may be used. Although it will ultimately diffuse into the tissues, it helps temporarily to prevent capillary stasis and maintain cardiac output(28). Alkalinizing solutions such as sodium bicarbonate and sodium lactate have been recommended, but their effectiveness has not been fully proven(28b,29).

### *Vasoconstrictor substances*

By diverting blood to the brain and thus restoring the activity of vital centers such as those controlling respiration, vasoconstrictor substances may be of temporary value in acute hypotension. Their prolonged use in shock is of doubtful value, however. In fact, shock has been produced experimentally in this manner, probably as a result of tissue anoxia and accompanying stagnation(30).

### *Anesthesia*

It appears that full anesthesia, at least with the barbiturates, renders animals less,

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27. Bobb, J. R. R. and Green, H. D.: Role of the Kidney in Resistance to Ischemic Compression Shock, Fed. Proc., in press.

28. (a) Warren, J. V., Merrill, A. J., and Stead, E. A., Jr.: Role of Extracellular Fluid in Maintenance of Normal Plasma Volume, J. Clin. Investigation 22:635-641 (Sept.) 1943; (b) Frank, H. A., Seligman, A. M., and Fine, J.: Traumatic Shock; The Treatment of Hemorrhagic Shock Irreversible to Replacement of Blood Volume Deficiency, J. Clin. Investigation 24:435-444 (July) 1945; (c) Winkler, A. W., Danowski, T. S., and Elkinton, J. R.: The Role of Colloid and of Saline in the Treatment of Shock, J. Clin. Investigation 25:220-225 (March) 1946; (d) Noble, R. P. and Gregersen, M. I.: Blood Volume in Clinical Shock; The Extent and Cause of Blood Volume Reduction in Traumatic, Hemorrhagic, and Burn Shock, J. Clin. Investigation 25:172-183 (March) 1946; (e) Glasser, O. and Page, I. H.: Intra-Arterial Transfusion in the Treatment of Experimental Hemorrhagic Shock, Cleveland Clin. Quart. 14:121-125 (April) 1947.

29. Ingraham, R. C., and Wiggers, H. C.: Alkalinizing Agents and Fluid Priming in Hemorrhagic Shock, Am. J. Physiol. 144:505-512 (Sept.) 1945.

30. Freeman, N. E., Freedman, H. and Miller, C. C.: Production of Shock by Prolonged Continuous Injection of Adrenalin in Unanesthetized Dogs, Am. J. Physiol. 131:545-553 (Jan.) 1941.

rather than more, susceptible to hypotension produced by *hemorrhage*(21b-d). On the other hand, it has been our experience, that after *trauma*, chances of survival are better when freedom of movement is allowed than when the animal is fully immobilized. It is probable that venous return is improved by the massaging effect of muscular activity.

### *Environmental temperature*

Investigators are agreed that cooling traumatized or ischemic tissues greatly reduces the severity of the hypotension and increases the chances of survival. This effect is due in part to a decrease in the volume of fluid lost in the traumatized tissues(20b,c).

It has been observed that operations performed in hot rooms are more likely to be attended by hypotension and shock than those performed in a relatively neutral environment—that is, a temperature between 20 C. (68 F.) and 24 C. (75 F.), at which neither shivering nor sweating occurs(31). This observation is confirmed by experiments on animals in which it has been clearly demonstrated that neutral environmental temperatures provide better chances for survival from standardized hemorrhage or trauma(20b,c,32)

A high environmental temperature results in increased loss of water by evaporation, induces cutaneous vasodilatation, and demands a greater cardiac output. Not infrequently the body temperature and basal metabolic rate of a subject in shock rise in a hot environment, because of inability to lose heat. All of these factors increase the discrepancy between the demands of the body for blood and the capacity of the circulatory system to supply these demands, and thus favor the development of further tissue anoxia and vascular stasis.

### *Heparin*

The use of heparin has been proposed in the treatment of frost-bite and immersion—that is, trauma by cold(33). This method of therapy is apparently safe, inasmuch as no deleterious effects were noted when quite large quantities of the drug were given intravenously in experimental traumatic shock(32).

Prompt therapy has very frequently performed miracles in early shock. So far as I am aware, however, no form of therapy is more than temporarily effective once *severe* true shock has developed with *marked* circulatory deterioration.

### *Summary*

1. Simple hypotension follows: (a) loss of circulating blood by hemorrhage externally or into traumatized tissues, and (b) transudation of plasma into traumatized or burned tissues. This hypotension is due to reduction of venous return and cardiac output. It is readily counteracted by the administration of suitable replacement fluids.

2. If reduced cardiac output and hypotension persist for any length of time, true or irreversible shock develops. Deterioration of the circulation results in further decline in cardiac output and arterial pressure, and the condition becomes refractory to therapy by infusion.

3. The severity of true shock depends upon the extent and duration of the reduction in cardiac output. Cardiac output may be considerably reduced in the presence of an essentially normal arterial pressure. Under these circumstances the pulse pressure will be markedly reduced.

4. The progressive deterioration of the circulation in true shock appears to be due principally to pooling or stagnation of blood in the various vascular beds. It may also be due in part to the development of relative myocardial insufficiency.

5. The reduction of blood volume appears to be slightly less in traumatic shock than in shock due to hemorrhage. There may, however, be a greater degree of stagnation in the former type of shock. At present the evidence suggests that toxic substances released from traumatized tissues play little, if any, role in the induction of shock.

6. Therapy should be aimed at early restoration of blood volume and of cardiac output before true shock develops. Anesthesia may not be harmful in shock due to hemorrhage. Slight muscular activity, however, favors maintenance of cardiac output more than does complete immobility. Recovery is favored by a neutral to cool environment, both for the patient and for his traumatized tissues. Heparin does not aggravate shock.

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31. Bradshaw, H. H.: Personal Communication.
32. Bobb, J. R. R., and Green, H. D.: Absence of Any Influence of Heparin upon Ischemic Compression Shock Studied at Various Environmental Temperatures, Fed. Proc., in press.
33. Prevention of Frostbite Gangrene, Editorial, J.A.M.A. 129: 279 (Sept. 22) 1945.

# RENAL TUMORS

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WINSTON-SALEM

### *Incidence*

"It is estimated that 2% of adult tumors and 20% of children's tumors are renal."(1) The greatest majority of renal tumors occur during the first decade and in the latter half of life. Bell(2), studying 30,000 autopsies, found no renal tumors in individuals in the second and third decades, save one case of tuberous sclerosis in a girl 14 years of age. Weisel and his coworkers(3) have found that the incidence of sarcoma of the kidney in patients coming to the Mayo Clinic is 1:30,000. Epithelioma was four times as common as sarcoma, hypernephroma twenty times as common. Wilms' tumor occurred once in every 25,000 patients. Of 35 sarcomas, one occurred in each of the first three decades, 7 in the fourth decade, and 25 in patients above the age of 50.

The renal tumor most frequently encountered in children is the embryoma or embryonal mixed tumor. It is commonly referred to as Wilms' tumor, embryonal adenomyosarcoma, or congenital mixed tumor, and is generally found during the first three years of life. Boyd(4) states that it is infrequent after the age of 5. Campbell(5) says that three fourths of these tumors appear before the age of 5, and two thirds before the third year. There have been cases reported in the adult, but these are quite rare. Tuberous sclerosis is found in children infrequently, and the other renal tumors are very uncommon.

The adult is afflicted by tumors of the parenchyma and of the pelvis. Papilloma and carcinoma comprise this latter group, but the parenchymal tumors are more numerous and more difficult to diagnose. The most frequent kidney tumor in adults is the adenocarcinoma, usually designated hypernephroma. The age-old controversy concerning the proper nomenclature and the origin of these tumors has not been settled. The sarcomas and Wilms' tumor complete the list of tumors generally recognized as malignant. The renal adenomas, however, are under strong suspicion as being pre-malignant. Bell(2) believes that no certain distinction can be made between adenomas and carcinomas. Deming(6) states that Dr. Cabot has shown in an exhaustive study that renal adenomas are potentially malignant. According to Fite(7), "The similarities between the cancerous and the noncancerous (adenomatous) tumor of the renal cortex are sufficiently great that a description of one is almost a description of the other."

The group of renal tumors designated as non-malignant includes fibroma, leiomyoma, lipoma, and hemangioma. It is singular that the first three of these tumors rarely produce symptoms; they are usually quite small. Hemangioma is also silent unless it erodes the pelvic or caliceal wall.

### *Diagnosis*

In their inception tumors in hidden viscera seldom produce noticeable symptoms. Particularly in the kidney, a tumor may attain considerable size before producing discomfort, hemorrhage, or symptoms suggestive of disorders of the gastrointestinal tract. Occasionally symptoms arising from distant metastases in the lungs, liver, bone, brain, or lymph nodes may be the first warning of a renal tumor.

Walters(8) found that lumbar pain, a detectable mass in the region of the kidney, and hematuria occurred alone or collectively in practically all of 256 patients operated on for renal tumor between 1901 and 1927. He cited Judd and Hand, who found one of these three symptoms to be present in 99 per cent of 367 patients with cortical tumors. Weisel, Dockerty and Priestley(3) found an abdominal mass and colicky pain, alone or together, in 88.6 per cent of 35 patients operated on for sarcoma. One patient showed homolateral varicocele; 4 exhibited elevated temperature. Davidson(9) has reported a case in which repeated chills and fever were the only symptoms.

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From the Department of Urology, the Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina.

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In Deming's series of 82 cases of renal tumor(6), only 22 per cent were considered symptomless; these were discovered during routine physical examination. He aptly states that while textbooks give 40-45 per cent as the usual incidence of symptomless renal tumors, the better and more frequent routine physical examinations being done today may change these figures.

The first use of x-ray was a plain film of the abdomen in 1898 showing an enlarged renal shadow(1). Albarran and Ertzbischoff in 1908 reported the first pyelograms illustrating tumors of the kidney. The most valuable single aid in diagnosis is intravenous or retrograde pyelography, which shows distortion of the renal pelvis or calices. The very earliest change may be so slight that it cannot accurately be distinguished from a normal variant. In such an instance it may be necessary to repeat these studies at intervals of two to three months. Renal cysts, single or multiple, cannot always be accurately diagnosed by roentgen examination.

Anomalies and cystic disease not infrequently cause difficulty in differential diagnosis; a discussion of these conditions does not belong in this paper, however.

In doubtful cases of renal tumor, one should always remember that the odds strongly favor the malignant rather than the benign lesion, and that there is little excuse for delaying surgery.

### *Therapy*

The best results reported to date in the treatment of malignant renal tumors have followed their surgical removal. Since the first recorded nephrectomy was performed in 1861 by Dr. Erastus B. Wolcott(10), the mortality rate from this procedure has been greatly reduced by improvement in the technique of anesthesia, pre- and postoperative care, and asepsis. In addition, the inspection of the renal vein for tumor thrombi and removal of these, even from the vena cava, have prolonged the lives of many.

The use of radiation, both x-ray and radium, has been extensively employed, alone and in conjunction with operation. In many instances this form of treatment is still being used, but rarely except in combination with surgery. The most dramatic result is found in the preoperative treatment of Wilms' tumors. Most of these shrink rapidly, but promptly recur unless the involved organ is subsequently removed. Radium has been used in cases where the mass could not be safely removed.

### *Results*

In Walters' series of 256 patients nephrectomized for tumor between 1901 and 1927(8), 110 or 43 per cent lived five years or more; 68 lived from five to ten years; 22 lived more than ten years; 15 lived between fifteen and twenty years; and 5 lived more than twenty years. In 41 patients the tumors could not be removed; biopsy was performed, and the patients were then given radiation in the form of radium or x-ray or both. Seventeen per cent of these lived more than five years. Walters feels that five years is insufficient time to evaluate a cure, and believes that the degree of malignancy (as determined by Broder's index) and the size and extent of the lesion are in inverse proportion to the duration of life and the completeness of cure. Metastases have been reported as late as twelve years postoperatively.

According to Priestley(11), 502 patients with adenocarcinomas treated by nephrectomy between 1910 and 1936 had a survival rate of 38.4 per cent for five years or more and 27.3 per cent for ten years or more. During the same period the three-year survival rate in 37 patients with Wilms' tumor was 23.5 per cent; 9.1 per cent lived ten years or longer. He advocates pre- and postoperative x-ray therapy for Wilms' tumor.

Ladd(12) recommends extirpation of Wilms' tumor without waiting for pre-operative irradiation, assuming that metastases may occur during this interval. In a series of 60 cases, he reported 14 as probable cures. (Four (6.7 per cent) had lived more than ten years, 7 more than three years, and 3 more than two years.)

Weisel(3) feels that only about 10 per cent of patients with renal sarcoma are likely to survive five years. Meade(13) reported a case of sarcoma in which the patient was well eight years postoperatively; he concluded that this period of survival cast doubt on the malignant nature of this particular tumor.

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### *Summary*

1. Complete urologic study to rule out malignant renal tumors is imperative in any patient with unexplained lumbar ache, colicky pain, abdominal mass, hematuria, or any combination of these complaints. When doubt still exists, surgical exploration is indicated.

2. Cure of malignant renal tumors by x-ray or radium treatment is almost unknown. The results of nephrectomy performed early in the disease are decidedly more encouraging.

3. Ten instead of five years' survival without symptoms should be the criterion of cure.

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# Maternal Welfare Section*

## HEMORRHAGE IN THE LAST TRIMESTER OF PREGNANCY

Hemorrhage complicating pregnancy is rapidly becoming the outstanding cause of maternal death in the nation. As has been pointed out in this section previously, toxemia is the principal cause of maternal deaths in North Carolina, with hemorrhage in the antenatal and postpartum periods second. If the deaths to which bleeding contributed are included, however, the number of deaths from hemorrhage will exceed those from toxemia. Twenty-nine of the first 100 deaths studied by the Maternal Welfare Committee were the direct result of hemorrhage, and in many others which resulted from infection or other causes hemorrhage was a contributing factor.

The various etiologic factors which cause bleeding in the antenatal period bear a definite relation to the trimester of pregnancy. We are often able to make a presumptive diagnosis based on the character of bleeding, the associated symptoms, and the duration of pregnancy. In the vast majority of instances abnormal bleeding prior to the third month of pregnancy is related to abortion or to ectopic pregnancy. Bleeding associated with abortion is a common cause of death in our state, and the next Maternal Welfare Section will be devoted to the management of abortions. Placenta praevia and abruptio placentae, which are characteristically lesions of the third trimester, should not be considered when bleeding occurs in early pregnancy.

From a practical point of view, a knowledge of the cause and amount of a patient's bleeding is of utmost importance in her management. The etiology of antepartum hemorrhage is also of considerable academic interest. By an understanding of the etiologic factors, we can often help to prevent the occurrence of bleeding. Abruptio placentae is often associated with toxemia of pregnancy; this complication can be anticipated and often prevented in patients with hypertensive disease. A previous cesarean section predisposes to rupture of the uterus, and in the management of such cases one should take into account the presence of the uterine scar.

### *Diagnosis of the Cause of Bleeding*

The causes of bleeding in the third trimester of pregnancy are listed below in the order of frequency:

1. **Labor**
2. **Placenta praevia**
3. **Premature separation of the placenta (abruptio placentae)**
4. **Miscellaneous causes**
5. **Rupture of the uterus**

The onset of premature labor is by far the most common cause for bleeding in the third trimester of pregnancy, and failure to consider this possibility often causes the patient and her family undue alarm, and at times leads to an unjustified operation. Profuse bleeding from a small cervical laceration often accompanies labor. Placenta praevia and premature separation of the normally implanted placenta (abruptio placentae) represent the most common *serious* causes for bleeding in the third trimester, and an accurate diagnosis is essential to satisfactory management of these conditions. Other less common causes of bleeding in the third trimester of pregnancy can be diagnosed only by a careful study of the patient. They include cervicitis, polyps, carcinoma of the cervix, and intrapartum infection.

The principal points which may be considered in the differential diagnosis of the three major causes for bleeding in the third trimester—namely, labor, placenta praevia, and abruptio placentae—are summarized in table 1.

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Table 1

| | Labor | Placenta Praevia | Abruptio Placentae |
|---|---|---|---|
| **Onset** | Gradual | Painless | Sudden |
| **Pain** | Rhythmic, intermittent, characteristic | Absent | Constant, severe, or absent |
| **Obvious Bleeding** | Common | Present | Usually present |
| **Color of blood** | Usually dark | Bright red | Usually dark |
| **Amount of blood** | Slight to moderate | Slight to profuse | None to profuse |
| **Warning** | Pain before bleeding often | Previous spotting | None—unless hypertension |
| **Cause** | Onset of labor | None | Rarely trauma |
| **Shock** | None | In proportion to blood lost | Excessive for visible blood lost |
| **Fetal movements** | Normal | Normal | Excessive or absent |
| **Effects of uterine contraction on bleeding** | Unchanged | Increased | Decreased |
| **Toxemia** | Average incidence | Rare | Frequent |
| **Uterus** | Normal between contractions | Normal | Tense to board-like; tender (may be localized) |
| **Abdomen** | Normal | Normal | No change, except uterus too tense, tender, distended |
| **Fetal heart sounds** | Present | Present | Frequently absent |

Although these factors help to determine the cause of bleeding, an aseptic vaginal examination is necessary before a final diagnosis can be made, or the method of management decided. Vaginal examination of the bleeding patient is never a safe procedure, and should not be done outside of a hospital. It should be done in an operating or delivery room, where all preparations have been made to proceed with any treatment necessary. Blood should be ready for administration, or a transfusion should be started prior to the examination, since free bleeding may result from the gentlest possible examination.

The vaginal examination should be performed by gently introducing the examining fingers and estimating the depth of the tissue between the fingers and the presenting part of the fetus in all quadrants of the pelvis. A thick mass suggests placenta praevia, and a finger should be gently inserted into the cervix to confirm or disprove the presence of the placenta. If no placental tissue is found over the internal cervical os, the examining finger should be gently carried around the lower uterine segment to feel for the placenta adjacent to the cervical canal. *A sterile bivalve speculum* must be inserted for a complete examination. If placenta praevia is not present, bleeding from the cervical canal (uterus) must be due to separation of the placenta or to a laceration. Small localized areas of bleeding due to polyps, erosion, or small lacerations can often be visualized on the cervix.

The dramatic textbook picture of severe or complete *separation of the placenta* is much less frequent than milder degrees of separation. Intense contractions, with failure of the uterus to relax between contractions, and mild degrees of shock are a more common picture. The danger to the patient is serious if the condition is not recognized and immediate treatment provided.

*Spontaneous rupture of the uterus* is a rare complication of pregnancy, except (1) when a previous cesarean section has left a scar-tissue defect in the uterine wall, or (2) when abnormally strong uterine contractions follow the use of pituitary extract during labor.

An oxytocic drug should *never* be given a patient who has had a previous cesarean section. The fact that the patient has had one or more normal deliveries since the cesarean was performed does not insure a normal course, for rupture of the scar may occur in any subsequent pregnancy. Rupture of the uterus following cesarean section may occur before the onset of labor, but as a rule it is a complication of the first stage of labor. When rupture occurs in the scar of a previous cesarean section, the patient may continue to have mild, atypical pains, but little or no progress of the labor is observed. Characteristically, however, the patient's pains stop abruptly when uterine rupture occurs. Fetal movements cease, and the fetal heart sounds disappear.

*Traumatic rupture or laceration of the uterus* often occurs as the result of an attempt to perform internal podalic version and extraction. This operation is dangerous under any circumstances, and every precaution should be taken if it is to be used.

The findings on examination of the patient vary with the extent of the rupture. In some cases shock is severe, and is far out of proportion to the apparent amount of blood lost. If the rupture is confined to an old scar, however, bleeding may be mild, and shock may be absent. The rent in the uterine wall may at times be clearly felt on examination of the patient's abdomen, and herniation of the intrauterine content through the defect may be suspected.

### *Management*

In each case of hemorrhage in the third trimester of pregnancy the management of the patient must be individualized. Among the factors which must be taken into consideration are:

1. **Parity**
2. **Condition of the patient**
3. **Amount of bleeding**
4. **Duration of pregnancy**
5. **Condition of the fetus**
6. **Condition of the cervix**
7. **Responsiveness of the uterus**
8. **Environment and available help**

A multiparous patient often has a partially dilated and effaced cervix at the time the complication occurs, so that a short and effective labor can be expected. In primiparous patients, on the other hand, the cervix is frequently long, undilated, and firm, suggesting that the first stage of labor will be relatively longer. While no general rule may be applied, a short, successful labor is more apt to occur in the multipara than in the primiparous patient.

The general condition of the patient and the rate of bleeding may often be important factors in the choice of management. The use of operative measures in the presence of shock is associated with a prohibitive mortality rate. The loss of large quantities of blood may so deplete the patient that emergency measures must be taken to control the bleeding until blood for transfusions is available. Prolonged slight bleeding often exsanguinates a patient so that a small additional blood loss is fatal.

The duration of pregnancy is not always an index of the size of the fetus, but with a fairly reliable history a decision can be made as to whether or not the baby's life should be considered in the management of the patient. Prior to the thirtieth week of pregnancy there is little chance for survival of the fetus regardless of the method selected, and the infant should not be considered in the management of the case.

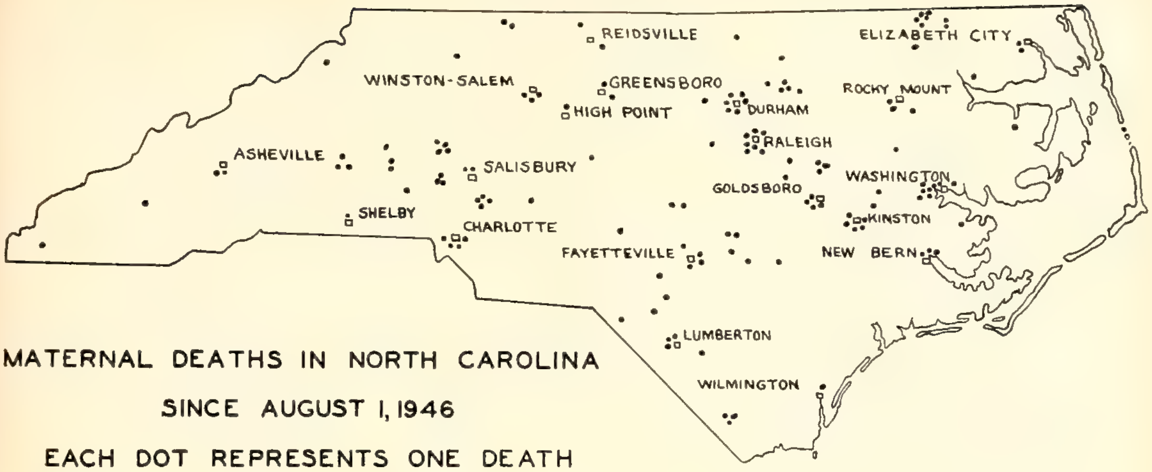
The condition of the cervix, which has been mentioned above, often plays an important part in our decision, since the expected duration of labor can be largely determined by an accurate evaluation of this pelvic structure.

The degree of uterine irritability and the possibility that uterine contractions will follow any of the measures commonly used to initiate labor must always be considered.

The importance of environment and available help cannot be overemphasized. The satisfactory management of severe separation of the placenta or placenta praevia requires the best facilities and equipment. Transfusions to replace the blood which has been lost must be the first step in the management of the patient. Her chance of survival is largely determined by the availability and use of blood transfusions. Many lives are lost because the patient is not sent to the hospital early enough, or because no transfusions are given until after the patient's condition becomes desperate.

### *Placenta praevia*

No attempt should be made to decide on the management of labor in a patient with



MATERNAL DEATHS IN NORTH CAROLINA
SINCE AUGUST 1, 1946
EACH DOT REPRESENTS ONE DEATH

painless bleeding until transfusion has replaced the blood which has been lost, or until blood is available for immediate administration. Selection of the method for managing the patient's labor and delivery depends upon an accurate diagnosis of the existing condition, and this can be made only by an aseptic vaginal examination. Vaginal examinations in the bleeding patient may precipitate severe hemorrhage.

The use of a vaginal pack in the management of placenta praevia is no longer accepted, since the pack often further displaces the placenta from the uterine wall and increases the bleeding. It may also act as a plug to conceal the blood which is backed up behind it in the vagina and lower uterine segment. The use of the conical bag and internal podalic version and extraction are unusually hazardous because of the friability of the placental site and the high incidence of traumatic rupture of the uterus.

When marginal placenta praevia is found on pelvic examination, simple rupture of the membranes will often suffice to control the bleeding during the first and second stages of labor. The use of a Willet's clamp on the infant's scalp, with a one-pound weight hung over the foot of the patient's bed to maintain traction, may frequently control the bleeding in cases of marginal or partial placenta praevia with vertex presentation. The head may thus be brought firmly into the cervix for tamponade.

It is almost universally agreed that cesarean section is the method of choice for the management of central placenta praevia. A cesarean operation may also be indicated in a primiparous patient with marginal placenta praevia, when the cervix is long and undilated. Whatever method is employed, the third stage of labor must be carefully followed, since postpartum hemorrhage commonly occurs.

### *Abruptio placentae*

The management of abruptio placentae (premature separation of the normally implanted placenta) depends directly upon the factors listed above, and upon the extent of the placental separation. In the vast majority of instances the spontaneous onset of labor follows premature separation of the placenta. Careful evaluation of the patient's condition is of utmost importance, because much of the bleeding may be concealed in the uterine cavity or in the amniotic sac, and profound shock may occur when there is little external vaginal bleeding. If the cervix is long, hard, and tightly closed and if there is severe internal hemorrhage, the best treatment is massive blood transfusions and immediate cesarean section.

More often the patient is seen when she is not in serious condition; the cervix is often patulous and admits two or more fingers; and weak, infrequent pains may be occurring. In such cases the method of choice is usually rupture of the membranes, the administration of ½ to 1 minim of pitocin (pituitrin) at intervals of thirty to forty-five minutes, with careful observation of the patient, and supportive therapy in the form of fluids and transfusions as often as indicated. If the child is dead, perforation of the fetal head to reduce its size may simplify the delivery. Internal podalic version and extraction of the fetus is a major operative procedure, and in North Carolina in the last four months five deaths have followed the use of this method on patients not prepared properly by transfusion.

*Rupture of the uterus*

In the presence of rupture of the uterus, laparotomy is indicated as soon as blood transfusions improve the patient's condition sufficiently to permit a major operative procedure. Hysterectomy may be necessary to control the intra-abdominal bleeding, since repair of the uterine wall is frequently impossible.

*Bleeding from minor causes*

The management of the numerous minor causes of bleeding in pregnancy is rarely difficult, if the cause of bleeding is diagnosed correctly. Bleeding from these causes occurs often enough to invalidate the presumptive diagnosis of placenta praevia in a large number of patients who have painless bleeding in the third trimester of pregnancy.

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## DOCTOR, YOU MUST KNOW*

Each year in the United States, cancer kills needlessly more than enough persons to populate one of the larger cities of North Carolina. This situation exists because diagnosis and treatment are too late.

Cancer control is the great medical problem of this day, and its solution is challenging some of the ablest brains in the scientific field. The magnitude of the problem has been recognized by special acts of Congress and of the North Carolina General Assembly, which designate the whole month of April as Cancer Control Month.

The facts about cancer are stark, but they must be faced—not by a few cancer specialists, but by the whole profession and the public—if the problem ever is to be solved. One of the most hopeful and significant developments of recent years has been the growing awareness of the menace of cancer. Three years ago, the public invested only $800,000 in the program of the American Cancer Society. It responded to last year's appeal by contributing $10,500,000. This year, the Society is asking for $12,000,000, and expects to pass that amount. The North Carolina Division, of which Mrs. George E. Marshall of Mount Airy is Commander, is expecting to raise $168,000.

One out of eight deaths in the nation is caused by cancer, which ranks second among diseases as a killer. It is infinitely more deadly to human life than is modern mechanized warfare. Between Pearl Harbor and V-J Day, the country lost 280,000 lives in the ranks of its military personnel. It spent $317,000,000,000 to conquer the Germans and the Japanese. In contrast, cancer took 607,000 lives in that same period, but the country spent only $2,000,000 on cancer research. It is estimated that the annual economic loss due to cancer is a thousand times that amount.

Only 15 per cent of the cancer patients who receive treatment are being cured. Doctors know enough about the disease and its management to save at least 30 per cent—possibly as many as 50 per cent—more. Several factors are involved in the present tragedy. Far too many persons do not know the truth about cancer. Adequate facilities for diagnosis and treatment are not within the reach of all. Fear of the disease is another factor.

A broad program of mass education is imperative. Everyone must be taught that cancer is curable, but that cure depends on early discovery and early treatment by competent physicians. Everyone, too, must be taught the simple danger signals which warn of the presence of cancer—the lump that is painless, the wart or mole which changes size or color, the abnormal discharge from some body opening, the persistent and unexplained indigestion, the sore which does not heal, the hoarseness or cough which is not due to a cold.

The American Cancer Society is undertaking to do this job. Here in North Carolina, the work has taken on such proportions that the Society has added to its staff a full-time Educational Director. She is Mrs. Donald E. Kent, of Chapel Hill. Her office is in Swain Hall at the University of North Carolina. Literature is distributed free; films are available at no cost for showing at meetings; and plans are being made for the development of an extensive school program. Radio programs, talks by doctors at club meetings, and magazine and newspaper articles are used to spread information about cancer.

The North Carolina Division believes that when it holds out to people the hope that cancer can be cured when found early, it must follow through by seeing that facilities for early diagnosis and treatment are available. Much needs to be done in this field. Clinics and treatment centers are too few for the need. Most of those which exist are concentrated in the central portion of the state, so that whole areas are without any. The North Carolina Division undertakes to aid clinics and encourage the establishment of others where they are needed. It makes surgical dressings for cancer patients, rents radium, and pays half the cost of treating indigent patients in cases where local units do not have sufficient funds for such service. In order that this work may be handled in an orderly manner, applications must be approved by the organization's Executive Committee, of which Dr. Thomas Leslie Lee of Kinston is chairman, before treatment is authorized.

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* This article was prepared by the North Carolina Division of the American Cancer Society for publication in the *North Carolina Medical Journal*.

It is all very well to conduct a program of mass education, and that difficult task must be done if the problem is to be coped with. But it must not be forgotten that the most important person in the picture is the family doctor—the first medical person to see the average patient with cancer. He is not expected to be a cancer specialist, but whether the patient lives or dies depends upon his knowing how to recognize conditions which demand immediate attention and upon his being on the look-out for them.

Doctor, you must know.

## METOPON HYDROCHLORIDE*

(Methyldihydromorphinone Hydrochloride)

In 1929 with the funds provided by the Rockefeller Foundation the National Research Council, through its Committee on Drug Addiction, undertook a coordinated program to study drug addiction and search for a non-addicting analgesic comparable to morphine. The principal participating organizations were the Universities of Virginia and Michigan, the United States Public Health Service, the Treasury Department's Bureau of Narcotics, and the Health Department of the State of Massachusetts, which brought together chemical, pharmacologic and clinical facilities for the purposes of the study. Metopon is one of the many compounds made and studied in this coordinated effort.

Chemically Metopon is a morphine derivative; pharmacologically it is qualitatively like morphine even to the proportion of tolerance and addiction liability. Chemically Metopon differs from morphine in three particulars; one double bond of the phenanthrene nucleus has been reduced by hydrogenation; the alcoholic hydroxyl has been replaced by oxygen; and a new substituent, a methyl group, has been attached to the phenanthrene nucleus. Studies made thus far indicate that pharmacologically Metopon differs from morphine quantitatively in all of its important actions: its analgesic effectiveness is at least double and its duration of action is about equal to that of morphine; it is nearly devoid of emetic action; tolerance to it appears to develop more slowly and to disappear more quickly and physical dependence builds up more slowly than with morphine; therapeutic analgesic doses produce little or no respiratory depression and much less mental dullness than does morphine; and it is relatively highly effective by oral administration.

In addition to animal experiments these differences have been established by extensive employment of the drug in two types of patients—individuals addicted to morphine, and others (terminal malignancies) needing prolonged pain relief but without previous opiate experience. In morphine addicts, Metopon appears only partially to prevent the impending signs of physical and psychic dependence. In terminal malignancy, administered orally, it gives adequate pain relief, with very little mental dulling, without nausea or vomiting, and with slow development of tolerance and dependence.

The high analgesic effectiveness of oral doses (with the elimination of the disadvantage to the patient of hypodermic injection), the absence of nausea and vomiting even in patients who vomit with morphine or other derivatives, the absence of mental dullness, and the slow development of tolerance and dependence place Metopon in a class by itself for the treatment of the chronic suffering of malignancies, and it is for that purpose exclusively that it is being manufactured and marketed.

Metopon will be available *only* in capsule form *for oral administration*. The capsules will be put up in bottles of 100 and each capsule will contain 3.0 mg. of Metopon hydrochloride. They can be obtained by physicians only from Sharp & Dohme or Parke, Davis & Co., on a regular official Narcotic Order Form, which must be accompanied by a signed statement supplying information as to the number of patients to be treated and the diagnosis on each. The drug will be distributed for *no other purpose* than oral administration for chronic pain relief in cancer cases.

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* This article was prepared by the Committee on Drug Addiction of the National Research Council, for publication in state and national medical journals.

The dose of Metopon hydrochloride is 6.0 to 9.0 mg. (2 or 3 capsules), to be *repeated only on recurrence of pain,* avoiding regular by-the-clock administration. As with morphine, it is most desirable to keep the dose at the lowest level compatible with adequate pain relief. Therefore, administration should be started with two capsules per dose, increasing to three only if the analgesic effect is insufficient.

Tolerance to any narcotic drug develops more rapidly with excessive dosage and under regular by-the-clock administration. Also, as a rule, the pain of cancer varies widely in intensity from time to time. Pain, therefore, should be the only guide to time of administration and dosage level. Tolerance to Metopon hydrochloride develops slowly. It can be delayed or interrupted entirely by withholding the drug occasionally for twelve hours, or for as much of that period as the incidence of pain will permit.

To each physician will be sent a record card for each patient to whom Metopon hydrochloride is to be administered. He will be requested to fill out these cards and return them in the addressed return envelope. He must furnish this record of his patient and his use of Metopon hydrochloride if he wishes to repeat his order for the drug. The principal object of this detailed report is to check the satisfactoriness of Metopon hydrochloride administration in general practice. The physician's cooperation in making it as complete as possible is earnestly solicited.

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The limited use of Metopon hydrochloride as described above has been recommended by the Drug Addiction Committee of the National Research Council, and the Committee, with the cooperation of the American Cancer Society, will supervise the distribution of the drug. The Committee is composed of Wm. Charles White, Chairman, Washington, D. C.; H. J. Anslinger, Commissioner of Narcotics, United States Treasury Department, Washington, D. C.; Lyndon F. Small, National Institute of Health, Washington, D. C.; and Nathan B. Eddy, National Institute of Health, Washington, D. C. Queries and comments on Metopon may be directed to Dr. Eddy, who will answer them for the Committee.

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# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## IV

## WILLIAM POTTS DEWEES

The father of American obstetrics, as he was called by Carson, was born at Potts-Grove (Pottstown), Pennsylvania, on May 5, 1768. The little settlement on the banks of the Schuylkill was named after Thomas Potts, a Quaker, grandfather of Dewees. His father was of Swedish descent. Having determined to study medicine, Dewees was placed in the establishment of Dr. Phyle, a practicing apothecary. He later entered the office of Dr. William Smith, and at the same time (1787-9) attended lectures at the University of Pennsylvania. In 1789 he obtained the degree of Bachelor of Medicine, and at once began practice in the village of Abington, some fourteen miles north of Philadelphia. The ranks of the profession having been thinned by the ravages of yellow fever, he was induced in 1793 to remove to Philadelphia.

At this period, his biographer Hodge states, the science of obstetrics was hardly known in America. Great prejudice existed against the employment of male practitioners. Those who wished to practice obstetrics had no opportunity for special training unless they could afford to visit Europe. Dewees was largely self-taught. He soon became a favorite with the midwives, and was often consulted. He also began a full private course of lectures on obstetrics, the first in America. "In a small office he collected a few pupils and in a familiar manner, indoctrinated them with the principles of our science, toiling year after year in opposition to the prejudices not only of the profession, but even of the community."

Plans were being made for a new chair of midwifery at the University of Pennsylvania, and Dewees, who aspired to the professorship, sought to improve his qualifications by obtaining his doctorate. An honorary degree was conferred upon him in 1805, for a thesis entitled "An Essay on the Means of Lessening Pain and Facilitating Certain Cases of Difficult Parturition." The method proposed was copious bloodletting. The venerable Shippen exclaimed, "How much misery might I have prevented had I known it forty years ago!"

In 1810, the Board of Trustees of the University passed the resolution which established midwifery as a distinct professorship. The struggle for the new chair was very warm, we are told, "and the claims of opposing candidates and the influence of their respective friends rendered the event doubtful. The strong claims of Dr. Dewees, his talents, his industry, his attainments,—his dexterity, boldness, decision and judgment, as a practitioner, his great success in the practice of the art, and as a teacher of its principles—his popularity, supported by the strongest testimonials from many distinguished men in the profession, including Rush and Physick, were met by analogous claims of opposing candidates, Dr. James and Dr. Chapman."

Failing to obtain the chair, Dewees once more turned his attentions to private practice, in which he was eminently successful. No woman of any social position in Philadelphia considered herself safe if she could not have Dewees in her confinement. He is credited with having delivered more than ten thousand women.

In 1824, James, because of declining health, sought assistance in his work as professor of obstetrics and the diseases of women and children. The Board of Trustees granted his request in the following resolution:

> "Be it ordained that an Adjunct Professor of Midwifery shall be appointed, who shall hold his appointment so long as Dr. James continues to be Professor of Midwifery; Provided that the expenses of the students shall in no manner be increased by such appointment, and that such Adjunct Professor shall not have any vote in the Faculty of Medicine, except in the absence of the Professor of Midwifery to whom he is Adjunct."

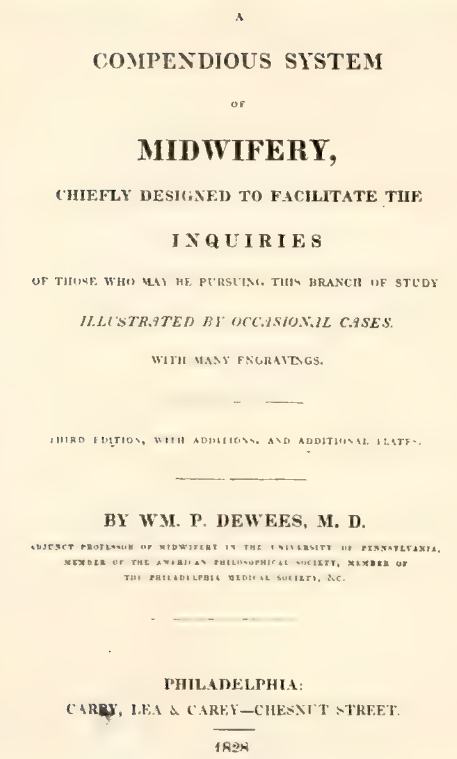
In accordance with this resolution Dewees was elected adjunct professor on November 15, 1825, at the age of 57. For the next nine years he was the practical occupant of the chair. In the fall of 1834, he was finally appointed professor of midwifery, a position to which he had aspired for a quarter of a century. He was able to deliver but one course of lectures, for his health broke and he resigned his professorship. He died in May, 1841, at the age of 73.

Dewees was an industrious writer. In 1807, his abridgment of Heath's translation of Baudelocque's *Midwifery* was published. In 1823, a number of articles in various medical journals were collected in a volume called *Essays on Various Subjects Connected with Midwifery.* The book contained twenty-two articles, the most important of which were upon superfetation, Denman's aphorisms on the use of forceps, retroversion of the uterus, and hemorrhage.

Dewees made no important contributions to gynecology, although his *Treatise on the Diseases of Females* (1826) went through ten editions. His *Treatise on the Physical and Medical Treatment of Children* (1825) marks the dawn of scientific work on pediatrics in this country.

The most important contribution of Dewees was *A Compendious System of Midwifery* (fig. 1), published in 1824, which went through fourteen editions. His views followed those of Baudelocque in preference to the more conservative English school taught in this country by James, Bard, and Francis. He had little patience with teachers "who make the whole art of midwifery consist in doing nothing!" While decrying indiscriminate interference, he pointed out that nature is not competent to all exigencies.

His description of the normal pelvis was



A

COMPENDIOUS SYSTEM

OF

MIDWIFERY,

CHIEFLY DESIGNED TO FACILITATE THE

INQUIRIES

OF THOSE WHO MAY BE PURSUING THIS BRANCH OF STUDY

*ILLUSTRATED BY OCCASIONAL CASES.*

WITH MANY ENGRAVINGS.

THIRD EDITION, WITH ADDITIONS, AND ADDITIONAL PLATES.

BY WM. P. DEWEES, M. D.

ADJUNCT PROFESSOR OF MIDWIFERY IN THE UNIVERSITY OF PENNSYLVANIA,
MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY, MEMBER OF
THE PHILADELPHIA MEDICAL SOCIETY, &c.

PHILADELPHIA:
CAREY, LEA & CAREY—CHESNUT STREET.
1828

**Fig. 1.** Title page of the third edition of Dewees' **System of Midwifery**, Philadelphia, 1828. (Editor's collection)

excellent. He believed that pelvic deformity was a rarity in this country, stating: "I have not met with extreme deformity in American women three times in my life." Whitridge Williams said that Dewees' views were perpetuated in all subsequent textbooks until the end of the century, and were probably one of the chief causes for the neglect of the study of contracted pelves and pelvimetry which for so long a period characterized American obstetrics. A careful study of Dewees' textbook does not entirely bear out this contention. "Without understanding the pelvis well," he wrote, "it is impossible anyone can safely give assistance, where either the operation of turning or the application of forceps is required to terminate labor." In another place he stated: "We hope that we shall be excused when we say, that no man should be trusted to practice obstetrics, who is ignorant of this important assemblage of bones."

Dewees was a master in the use of the obstetric forceps, and laid down excellent rules for their use. He recommended that for forceps delivery the patient be placed upon her back at the edge of the bed. He advised the student to prepare himself for the use of forceps "by the frequent application of these instruments upon the machine under all the various conditions the head may offer itself within the pelvis."

Dewees severely criticized Denman for limiting the use of forceps to maternal indications only. He believed that they should also be used for the safety of the baby, and was convinced that the lives of very many babies might be saved by their use. While realizing that the forceps had been "most wantonly used" by some, he felt that by others they had been "as improperly withheld," and he concluded:

> "When the circumstances of the case require the use of these instruments, the application should not be too long delayed, from an imaginary fear, that the woman might suffer from their use, or from an ill-grounded hope that the woman may deliver herself—we should, therefore, not permit her to be exhausted, or the child to perish, because feeble or inefficient pains attend, or because the head of the child has not been six hours in the passage."

Dewees considered that "the proper application of the forceps consists in their complete adaptation to the sides of the head of the child, or as nearly as may be over its ears." When the head was at the superior strait, he preferred version to forceps. He also considered the use of forceps for the after-coming head in breech delivery a distinct improvement. He warned against the dangers of the use of forceps in contracted pelves by inexperienced obstetricians, advising their use only "if the defects of size be in the lower strait and that not excessive."

Herbert Thoms says that Dewees' chapter on "Conduct during Labor" should be read by every young man entering upon the practice of obstetrics, for there is nothing quite comparable to this in our modern textbooks.

While he is often called the "American Baudelocque," there are many aspects about this great man which remind one of Smellie. Both were practical clinicians thoroughly familiar with their subject, which they had learned at the bedside of their patients. Certainly, William Potts Dewees well deserves the title of "father of American obstetrics"; his name will be revered wherever the art is appreciated.

Claude E. Heaton, M.D.
New York City

North Carolina Medical Journal

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April, 1947

## DR. WILLIAM ALLAN

It is fitting for this memorial number of the North Carolina Medical Journal to be dedicated to Dr. William Allan, a former president of the Medical Society of the State of North Carolina, and, at the time of his death, professor of medical genetics at the Bowman Gray School of Medicine. His long record of successful practice in Charlotte made him one of the acknowledged leaders of the profession in this state.

Dr. Allan was one of the first men in North Carolina to devote himself entirely to internal medicine, and was one of the most brilliant and original thinkers the medical profession of the state ever had. He did pioneer work on sprue, on amebic dysentery, and on rickettsial diseases. His greatest contribution to medical knowledge, however, was in the field of hereditary diseases. In recognition of this work, the Carnegie Corporation of New York supplied funds which made it possible for the Bowman Gray School of Medicine to have the first Department of Medical Genetics in the country.

Like Sir James MacKenzie, Dr. Allan combined research with practice. His example is one which any young medical man will do well to emulate.

* * * *

## THE MEDICAL CARE PROGRAM

The 1947 legislature passed with virtually no debate a bill appropriating money to carry out the recommendations of the Hospital and Medical Care Commission. This act launches one of the most ambitious medical programs ever undertaken by any state. Its provisions have been so thoroughly discussed in the pages of the North Carolina Medical Journal for many months that it is not necessary to recount them in detail. The sum of $10,040,000, which is to be supplemented by federal funds under the Hill-Burton act, was appropriated for the construction of hospitals within the state. Of this amount, $3,790,000—also to be supplemented by federal funds— is specified for the construction of a 400-bed hospital at Chapel Hill, to provide the plant necessary for the expansion of the present two-year school to a four-year school.

The bill provides that in case the amount now anticipated from the Hill-Burton act is reduced, the state's appropriation is to be reduced in proportion. One third of the amount needed for a community hospital is to come from the state's funds, one third from the community, and one third from the federal government.

While there was little or no opposition to the program of community hospital construction, there was considerable difference of opinion as to the need for another four-year medical school. Many doctors as well as laymen felt that it would impose an unnecessary tax burden on a state which already has one of the highest tax rates in the Union. Many others, however, felt that the four-year school was an essential part of the program. Now that the program has been adopted in its entirety, it is to be hoped that the doctors of North Carolina will unite in their determination to make it succeed.

## THANKS, NEIGHBOR!

An editorial in the *Virginia Medical Monthly* for April bids welcome to the Medical Society of the State of North Carolina, which will hold its annual meeting at Virginia Beach in May. The editorial is so filled with characteristic Virginia hospitality that our chagrin at having to leave home for this meeting should be considerably lessened. The editorial concludes with this paragraph:

> "In the matter of meeting places for medical meetings, Virginia, with its Hot Springs, Colonial Williamsburg, Virginia Beach, Richmond and Roanoke, is more fortunate than most States. She can take care of all but the largest medical meetings, and she rejoices in being in a position of being helpful to her sister State. North Carolina and Virginia doctors have the same background and their problems, traditions and ideals are identical. Nothing but a poorly marked State-line separates them. We welcome our brothers of North Carolina to our State for their annual meeting and predict that they will feel as much at home as if they were meeting amid the beautiful long leaf pines."

## AN ALMOST IDEAL NARCOTIC

On page 243 will be found a most important article prepared by the Drug Addiction Committee of the National Research Council. This article tells of a new morphine derivative, Metopon hydrochloride, which apparently will rapidly become the drug of choice for alleviating the pain of cancer, and eventually other types of intractable pain.

The purpose of this editorial is to call attention to this article, and to note that the high reputation of the men who have sponsored Metopon hydrochloride is a guarantee of its worth. Doubtless most of the doctors in this state who have to make more comfortable the last days of cancer victims will welcome this new drug, and will give it a trial at the first opportunity.

## OUR SMALLEST EXCHANGE

In the January issue the *Chinese Medical Journal* was referred to as the most valuable exchange of the North Carolina Medical Journal, since its subscription price in Chinese money is $2400 a year, or $500 for a single copy.

Now tribute is paid to our smallest exchange. The issues of the *British Medical Journal* for February 22 and March 1 each consisted of a single sheet mimeographed on both sides. They were printed by candlelight on duplicators, the motor power being furnished by human muscles. The small size of these issues was due, of course, to the shortage of coal in England. All newspapers and magazines — including medical journals — were ordered to suspend publication for a minimum of two weeks, and the *British Medical Journal* was one of the few periodicals which did not yield supinely to this order.

The London correspondent of the *Journal of the American Medical Association*(1) recalls that all through both World Wars English medical journals were published regularly, though under difficulties, and that "never before has the reading medical public been faced with a total suppression of issues." The correspondent then points out that "The only new element in the situation is a socialist government . . . it is argued that to make political capital out of a natural phenomenon—the prolonged arctic spell—is not fair. But this reply does not meet the criticism that the government should have in time built up a coal reserve for the bad weather always a possibility at this time of year. Instead it gambled on its absence . . . Socialism can easily enact higher wages but never seems to ensure increased efficiency . . . The British public will learn soon more of the ill results of a system which removes all incentive to work well."

In its issue for March 8 the *British Medical Journal* returned to its normal appearance, with forty pages of reading matter. A few excerpts from the many letters written by British doctors show that they have lost neither their British determination nor their sense of humor. One, for example, compares "the disastrous days of war" with "the even more drastic ones of the peace that passeth understanding." Another ends a note of commendation with a wish "that the Government would show evidence of similar enterprise."

The North Carolina Medical Journal sends congratulations to our British colleagues for the initiative and ingenuity displayed in keeping their publication record unbroken.

1. Foreign Letters, J.A.M.A. 133:880 (March 22) 1947.

# MEDICOLEGAL ABSTRACT

J. F. Owen, LL.B., F.A.P.A.

Raleigh

Insane Persons: *A guardian may be appointed when mental weakness exists making the incompetent an easy prey for designing persons, it being unnecessary to wait until loss of property occurs. Selection of a guardian is in the discretion of the court.*

In this case a petition was filed in the proper court for the appointment of a guardian for a man 73 years of age and allegedly suffering from a mental disorder. It was shown to the satisfaction of the court that the alleged incompetent was unstable from an emotional standpoint, was flighty in his speech and behavior, entertained and expressed grandiose ideas, and had little, if any, conception of the true value of his property. Evidence was introduced showing that the defendant cried without provocation and would cry upon being asked a question. It was shown that one day he would offer to sell his home, which had an actual value of $3,500, for $1,400; he would send people to look at it, and the next day would change the price to $4,500. He had many plans for entering types of business for which he had no training or experience, and he lent money to strangers without requiring notes or collateral.

The court, finding the facts as alleged to be true, proceeded to appoint a stepdaughter guardian for the incompetent. This appointment was made despite the suggestion of the defendant that a bank be selected to act in this capacity.

In appealing from the judgment of the lower court the appellant put forth many objections, but the ones of medical interest had to do with the evidence submitted and the objection to the appointment of the stepdaughter as guardian. The attorney for the appellant urged that the evidence was insufficient to show that the aged man was incompetent to care for himself and his property. In reply to this contention the court stated that: "In cases of this kind it is not necessary to wait until actual loss or damage before the beneficent provisions of these statutes (guardianship laws) may be invoked. It is sufficient when the mental weakness exists, which makes the unfortunate one an easy prey for the designing." It was the opinion of the court that the behavior of the incompetent before the trial court and the testimony referred to above were sufficient. It was claimed by the appellant that it was erroneous to have appointed the stepdaughter, who was also the guardian for her mother, the wife of the ward. The suggestion was made that her interests in serving both would be conflicting. The court held in this regard that the appointment of a guardian is in the discretion of the court, and that the trial court was not required to give any weight to the wishes of the ward in selecting a guardian.

From the above findings the medical profession may feel a little more courageous in recommending guardians where the circumstances seem to warrant such action. In this way property of incompetents can be conserved, and the patient may be relieved of responsibility which, in the majority of instances, he can ill afford to assume. The courts require only that mental weakness shall exist to the point where the patient is likely to become the victim of designing persons, and do not hold that actual loss of property must have occurred.

(District Court of Appeals, Division 1, California, Dec. 12, 1928. Pacific Reporter, V. 273, p. 69.)

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**Psychosomatic history taking.** The introduction of the psychosomatic point of view does not require a different form of history taking; it only requires an awareness of the role that the emotions play in illness and hence more emphasis on certain aspects of history taking. Thus the history need not differ in form but it must differ in substance. . . . more attention will be paid to the behavior of the patient and to the actual words that he uses in describing his complaints as well as the asides and apparent irrelevancies that so often give important clues to the emotional factor. Other fundamental considerations are to give the patient time, allow him to talk with as few interruptions as possible. Avoid extensive note-taking so that the patient may feel that you are more interested in him as a person than in the setting down of the history. Show interest and sympathy for what the patient sometimes regards as trivial or silly and pay close attention to the chronologic development of the life history, with special emphasis on the various factors in the childhood period that may have influenced the development of the personality. Special attention should be given to puberty and adolescence with their frequent emotional problems and to the epochs and crucial periods in life when psychosomatic disturbances are apt to arise. Try particularly to obtain a more complete picture of the family background.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:160 (Nov.) 1946.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX April, 1947 No. 4

AMONG community welfare agencies, hospitals have an important place and are a proper concern of every good citizen. The physician, however, is even more immediately involved in hospitals and their policies. The hospital occupies a necessary and vital place in his professional activities, so that proposed changes in hospital procedures and activities merit and receive his closest scrutiny and informed judgment. The present drive to popularize routine chest X-rays for all patients admitted to general hospitals was launched by physicians whose only interest was the protection such a measure affords both to patients and to hospital personnel.

## THE OPPORTUNITY

Tuberculosis, which remains a major health problem all over the world, has been under concentrated attack in this country for over 40 years. The greatest effort ever made to eradicate tuberculosis in livestock in the United States was begun about 1900. The result is that today the milk we drink comes from tuberculosis-free dairy herds and our meat comes from non-tuberculous animals.

Viewed from the standpoint of all humanity, this remarkable achievement is little more than an impregnably secured beachhead; but for Americans it has meant almost complete elimination of all human forms of bovine tuberculosis (largely tuberculosis of the bones). Ultimately other countries must also reduce animal tuberculosis.

Today, hospitals are participating in the greatest direct effort ever made to eradicate tuberculosis in humans. This movement began rather slowly about 20 or 25 years ago with tuberculin testing programs for selected groups. This was accompanied by construction of numerous sanatoriums to care for discovered cases. Soon it was learned that physical diagnosis would not discover early cases, but that the X-ray could. There has been real progress. National tuberculosis mortality rates have declined and some areas have achieved mortality lows which were not considered possible 40 years ago.

Despite all this, it was not until about ten years ago that the prospect of complete eradication became a foreseeable probability. The earlier programs, depending on tuberculin testing, physical diagnosis and limited use of the X-ray, were too cumbersome and expensive for universal coverage and diagnosis of cases in their early stages. These handicaps were overcome by the development of photofluorographic X-ray equipment and there now appears to be justifiable optimism toward the problem of tuberculosis eradication.

The Council on Professional Practice of the American Hospital Association believes that the immediate need is to extend the practice of routinely X-raying chests. This should be done in many different population groups, but the council is, of course, primarily concerned with the hospital program. A few statistics and facts may be worth repeating.

Hospital admissions now exceed 16,000,000 a year. There are other undetermined millions who are seen in outpatient clinics. These two groups lend themselves to routine radiography; they are in hospitals which have the X-ray equipment and the specialists; there is a minimum of inconvenience to the patient; there is a minimum of expense to the procedure; the percentage of cases found is higher than in other large cross sections of the population. Furthermore, many of these persons would not be reached by programs directed at industrial or other population groups. Finally, this is one of the largest organized groups available for routine programs.

Hospitals which routinely X-ray chest of admissions, outpatients and employees give additional service to their patients and provide a new protection to the hospital. Infectious cases may be segregated from other patients; the employee knows with which patients he must use added precautions to protect himself; in up to ten per cent of patients non-tuberculous conditions may be revealed. It is not intended here to exhaust the arguments in favor of routine chest radiography in hospitals. Those described are important enough to justify the procedure, if the routine is practicable—administratively and economically. It is noteworthy that the Council program stresses practicability rather than theory.

Two years ago the Council surveyed all hospitals to determine the extent of routine radiography. Of 104 hospitals reporting programs, further checking suggests that only a moderate per cent had a routine considered adequate today. On the other hand, a few weeks ago at a regional hospital meeting a dozen or more administrators indicated their hospitals are now X-raying chests routinely. In one state two photofluorographic units have been purchased by local tuberculosis associations and placed in hospitals, and four more are on order, or have had funds earmarked for the purpose. The U. S. Public Health Service has approved, or will approve, funds for state and local health departments with which to place several hundred X-ray units in hospitals. Many hospitals are setting up the programs on their own or other resources.

Hospitals generally are now much more interested than they were a few years ago in making their facilities available, not only for the care of tuberculosis cases, but for other long-term treatments, such as those required for psychiatric patients and convalescents. It has been difficult to increase this type of service because of crowded conditions in hospitals.

The institution of case-finding routine radiography by hospitals, however, will bring general hospitals face to face with the necessity of providing facilities for temporary handling of some of the discovered cases.

Routine chest X-raying should not be deferred simply because of the fact that cases of tuberculosis will be discovered. These patients are in hospitals for other reasons in the first place. Failure to discover tuberculosis results in these undiagnosed cases of tuberculosis exposing other patients and employees to tuberculosis. Until new construction permits adequate care for tuberculosis itself, hospitals should be able, with the aid of the manual "The Management of Tuberculosis in Hospitals,"* to accept with safety tuberculosis patients for non-tuberculosis treatment.

Human tuberculosis is under the most severe attack ever directed at it. The best thinking today appears to be that eradication will be achieved only after a long pull; that more intensive discovery programs will continue to increase the known cases for years to come; that the sensible course is to create the programs and facilities necessary now to maximum discovery and adequate treatment.

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*Published by the American Hospital Association, Revised Edition, 1946.

Many national, state and local organizations are coordinating their efforts to eliminate this disease. The hospital has a dominant part in the program. It can become a major case-finding agency by routinely X-raying the chests of all patients on admission, all outpatients and all employees.

**The Opportunity, Robin C. Buerki, M.D., Hospitals, August, 1946.**

# BULLETIN BOARD

## PRESIDENT'S MESSAGE

At the request of President Coppridge, the following article by Dr. William deB. MacNider is published as this month's "President's Message."

### BRAXTON BYNUM LLOYD, M.D.

### 1886-1947

The village of Carrboro, Chapel Hill, and a wide surrounding country area were saddened by the death of Dr. Lloyd at his home in Carrboro in the early hours of Thursday, March 20. These areas in which Dr. Lloyd served the people, his people, in distress for thirty-five years were not shocked; to repeat, they were saddened in his death. We paused in our daily tasks, without being signalled to stop, and in silence we thought of his goodness, a certain rugged honesty, and his willingness to go as a good physician whenever and wherever he was called. "Brack" Lloyd was the village and country doctor at its height of expression. His like will not come again; first, because at the present time so few physicians go into the practice of medicine to give their all to those in physical and mental distress in country districts, and second, on account of the fact that with good roads, the automobile and telephone, this ready-to-go, sturdy type of doctor friend is not necessary as he once was compellingly essential. The intimacy of the doctor as friend and confidant has unnecessarily given away to the doctor as a scientific technician. The loss to the patient is immeasurable, for all of our ailments cannot be instrumentally measured. There are many that respond best to the friendly physician in whom faith, affection, and freedom of confession are made possible by his personality.

Dr. Lloyd was the son of William P. and Mary Sparrow Lloyd. He was born on Christmas Day, 1886, on his father's farm near Carrboro. His education was obtained at the Chapel Hill schools and the University of North Carolina. He received his doctorate in medicine from this institution in the spring of 1909. For three years he interned at the Newark Eye and Ear Hospital, becoming as a result of the effectiveness of this service, resident physician. During his stay in Newark he became acquainted with and later married Miss Emma Hanse, who survives him. Dr. Lloyd gave his life to his patients. Mrs. Lloyd gave her life as an ideal physician's wife to him. Following Dr. Lloyd's residency at the hospital in Newark he located in Carrboro for the general practice of medicine, and this practice he did in superb form. When called to see a sick person he considered it to be a command to go, and he went. The time of day or night and the difficulties of country travel over virtually impassable by-roads did not deter him. He was not unmindful of financial remuneration, but such considerations were secondary to the doctor urge within him to treat and to heal the sick. He did not "keep books." He never sent a bill. His monetary reward came freely from the hearts of the many he had helped.

Several days before Dr. Lloyd's death he was on a fifteen-mile trip to bring comfort to a sick person. Before reaching this home he had his first coronary occlusion. He completed his visitation. On the morning of March 20 a secondary attack of a similar nature supervened. At 4 a.m. his wife urged him to have a doctor. His reply was, "Give me a nitroglycerine tablet and let the good doctor sleep; he is likely tired." But with a summons from his wife the other good doctor came and eased his pain for sleep into eternity.

Dr. Lloyd's funeral was of him and like him in sincerity. The Baptist Church in Carrboro was filled. A loud speaker gave several hundred people on the outside the benefit of the simple service. People from Carrboro and Chapel Hill, from Orange and surrounding counties just sat or stood and found a natural easement in tears that came for "Brack."

WM. DEB. MACNIDER, M.D.
Chapel Hill

# NINETY-THIRD ANNUAL SESSION OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

## OFFICIAL CALL

According to the By-Laws, as amended at the 1940 Session, the House of Delegates will convene at Virginia Beach, Va., in the Ball Room of The Cavalier, Monday afternoon, May 12, at 2:00 o'clock.

Wm. M. Coppridge, M.D., President

Attest:

Roscoe D. McMillan, M.D., Secretary-Treasurer

## HEADQUARTERS, THE CAVALIER

### American Plan

The Cavalier
Gay Manor
Warner (Modified American Plan)
Waverly (Modified American Plan)
Sea Spray (Modified American Plan)
Essex House
Pinewood (Modified American Plan)
Traymore
Beach Plaza
Ivanhoe
Dundee Inn

## REGISTER PROMPTLY

Members of the State Medical Society, of the Auxiliary and all visitors are requested to register promptly at the Registration Desks in the Lobby of The Cavalier. Please present membership card when you register.

Registrations in charge of—

| | |
|---|---|
| Miss Annie Williams | Red Springs |
| Miss Catherine Johnson | Winston-Salem |

## ENTERTAINMENT

Arrangements have been made for a golf tournament and prizes. See Dr. Joseph J. Combs, or the Hotel Management, immediately upon arrival and the necessary information will be furnished.

## IMPORTANT

Each essayist is requested (see By-Laws) to hand to the Chairman following the reading of the paper, an original copy, together with any illustrations or other material used with the paper. Those desiring to review their papers before publication should make a carbon copy for such purposes. All papers should be typewritten and double spaced, with references arranged according to the form used in publications of the American Medical Association. The cost of cuts, in excess of $20.00, will be charged to the author.

## AWARD OF MOORE COUNTY MEDICAL SOCIETY MEDAL

### Rules Governing

The Chairman of each section in the North Carolina Medical Society shall appoint a committee of three, none of whom presented a paper or are connected with anyone who did so, to select a paper from that section to be presented to the Committee on Award. Papers presented in General Sessions shall be considered as belonging to the section of which the essayist is a member.

In accordance with this procedure it has been determined by the committee that each Chairman shall appoint a committee from his section to consider papers on the Section Program and advise their Chairman which paper in their opinion is most meritorious. The selection of this committee shall be forwarded through the Secretary of the State Medical Society to the chairman of the Committee on Award of the Moore County Medical Society Medal for their final decision.

The above outline of procedure will be followed with such modifications as will make it more easily workable in the future awards of this medal.

No physician except a Fellow of the Medical Society of the State of North Carolina, in good standing, shall be eligible to receive the award.

## BY-LAWS, CHAPTER III, SECTION 4

No address or paper before the Society except that of the President shall occupy more than fifteen minutes in its delivery; and no member shall speak longer than five minutes, nor more than once on any subject; provided that the terms of this section shall not apply to invited guests.

## RESUME OF PROGRAM

### MONDAY, MAY 12, 1947

9:00 A.M.—Registration Booth Opens
2:00 P.M.—House of Delegates of Medical Society (Ball Room)
5:30 P.M.—Intermission, House of Delegates of Medical Society
8:00 P.M.—House of Delegates of Medical Society Reconvenes (Ball Room)
8:30 P.M.—Bridge Party (Panorama Room, Beach Club)

### TUESDAY, MAY 13, 1947

7:30 A.M.—Officers' Breakfast, Medical Society (South Dining Porch)
8:00 A.M.—Registration Booth Opens
9:00 A.M.—Executive Board Meeting, Auxiliary to Medical Society (Hunt Room)
9:15 A.M.—First General Session of Medical Society (Panorama Room, Beach Club)
11:00 A.M.—Annual Meeting, Auxiliary to the Medical Society (Hunt Room)
1:00 P.M.—University of Pennsylvania Medical Alumni Luncheon (Warner Coffee Shop)
Jefferson Medical College Alumni Luncheon (Gay Manor Coffee Shop)
Medical College of Virginia Alumni Luncheon (Ball Room)
2:30 P.M.—Section Meetings, Medical Society:
Section on General Practice of Medicine and Surgery (Panorama Room, Beach Club)
Section on Public Health and Education (Library, U. S. O., Arctic Ave., between 17th and 18th)
Section on Pediatrics (Methodist Church, 18th St. and Pacific Ave.)
Section on Ophthalmology and Otolaryngology (Baptist Church, 17th and Arctic Ave.)
Section on Radiology (Episcopal Church, 18th St. on the ocean)
4:00 P.M.—Reception, Auxiliary to Medical Society (Hunt Room) honoring Mrs. Frederick R. Taylor, President; Mrs. Wm. M. Coppridge, wife of the President of Medical Society; Mrs. Roscoe D. McMillan, wife of the Secretary-Treasurer of Medical Society; Mrs. W. Reece Berryhill, President-Elect of the Auxiliary; Mrs. Frank A. Sharpe, wife of President-Elect of Medical Society; Mrs. Stuart Willis, wife of the Superintendent of the three State Sanatoriums, and other guests of the Society.

7:00 P.M.—President's Dinner (Dining Room and Ball Room)
7:40 P.M.—Presentation of Guests
7:50 P.M.—Presentation of President's Jewel to Wm. M. Coppridge, M.D.
8:00 P.M.—Address—Wm. M. Coppridge M.D., President of the Medical Society of the State of North Carolina, Durham
8:40 P.M.—Presentation of Golf Tournament Prizes
8:45 P.M.—Edmund H. Harding, Washington, N. C., The Tarheel Humorist
10:00 P.M.—President's Ball (Panorama Room, Beach Club)

WEDNESDAY, MAY 14, 1947

8:00 A.M.—Registration Booth Opens
9:15 A.M.—Second General Session of Medical Society (Panorama Room, Beach Club)
10:30 A.M.—Coca-Cola Hour (Hunt Room)
12:00 Noon—Conjoint Session, Medical Society and State Board of Health (Panorama Room, Beach Club)
1:00 P.M.—Wake Forest Medical Alumni Luncheon (Gay Manor Main Dining Room)
Duke University Medical Alumni Luncheon (Warner Coffee Shop)
University of North Carolina Medical Alumni Luncheon (Ball Room)
2:30 P.M.—Second Meeting House of Delegates (Panorama Room, Beach Club)
2:30 P.M.—Section Meetings, Medical Society:
Section on Practice of Medicine (U. S. O., Arctic Ave., between 17th and 18th)
Section on Gynecology and Obstetrics (Episcopal Church, 18th St.)
Section on Surgery (Methodist Church, 18th St. at Pacific Ave.)
Section on Neurology and Psychiatry (Baptist Church, 17th and Arctic Ave.)
5:00 P.M.—Third General Session, Medical Society (Ball Room)

## PROGRAM OF THE MEDICAL SOCIETY

### Monday, May 12, 1947

9:00 A.M.—Registration Booth Opens
2:00 P.M.—First Meeting of the House of Delegates (Ball Room)
Invocation—Reverend Coy Peterson, Virginia Beach, Va.
Intermission, 5:30 P.M. to 8:00 P.M.

8:00 P.M.—House of Delegates Reconvenes (Ball Room)

### Tuesday, May 13, 1947

7:30 A.M.—Officers' Breakfast (South Dining Porch)
Hugh A. McAllister, M.D,. Lumberton, Presiding
Invocation
Self Introduction of those attending
Hugh A. McAllister, M.D., Lumberton, and Reasons for Such a Meeting."
William M. Coppridge, M.D., President, Durham—"Activities of the State Officers During 1946-1947."
Frank A. Sharpe, M.D., President-Elect, Greensboro—"Preview of the Program for 1947-1948."
Joseph S. Hiatt, President Hoke County Medical Society, Sanatorium—"Portrait of the Ideal Association of County, District, and State Officers."
Roscoe D. McMillan, M.D., Secretary-Treasurer, Red Springs—Closing Remarks and Announcements
Adjournment

8:00 A.M.—Registration Booth Opens

FIRST GENERAL SESSION
(Panorama Room, Beach Club)
Tuesday, May 13, 1947

9:15 A.M.—Call to Order, Roscoe D. McMillan, M.D., Chairman Committee on Arrangements
Invocation—Reverend Robert E. Forrest, Virginia Beach, Va.
Announcements
9:25 A.M.—Presentation of President
9:30 A.M.—Report of Obituary Committee:
A. A. James, M.D., Chairman, Sanford
C. R. Monroe, M.D., Pinehurst
M. D. Bonner, M.D., Jamestown
9:40 A.M.—Report of Committee on Award of Moore County Medal:
W. T. Rainey, M.D., Chairman, Fayetteville
George T. Harrell, M.D., Winston-Salem
W. R. Stanford, M.D., Durham
9:45 A.M.—George T. Harrell, M.D., Director of Department of Internal Medicine, Bowman Gray School of Medicine, Winston-Salem —"The Integration of the Preventive Medical Aspects of Private Practice with a Public Health Program." (From Section on Public Health and Education.)
10:15 A.M.—Eugene A. Stead, Jr., M.D., Professor of Medicine, Duke University School of Medicine, Durham —"Recent Advances in our Knowledge of Congestive Heart Failure." (From Section on General Practice of Medicine and Surgery.)
10:35 A.M.—E. S. King, M.D., Winston-Salem — "Routine Blood Cultures in Pediatrics." (From Section on Pediatrics.)
10:55 A.M.—Robert B. McIver, M.D., Jacksonville, Fla.—Guest Speaker—"The Diagnosis and Surgical Management of Abdominal Pain in Non-Calculous Obstruction of the Upper Urinary Tract."
11:35 A.M.—R. Franklin Carter, M.D., Associate Attending Surgeon, Post-Graduate School and Hospital, New York—Guest Speaker—"Tumors of the Neck Encountered in General Surgical Practice." (From Section on Ophthalmology and Otolaryngology.)
11:55 A.M.—A. W. Oughterson, M.D., Medical and Scientific Director, American Cancer Society, New York—Guest Speaker—"Strategic Planning for Control of Cancer."
12:35 P.M.—Allan Tuggle, M.D., and Thomas A. Murrah, M.D., Department of Radiology, Charlotte Memorial Hospital, Charlotte—"Pericolitis and Pericolonic Masses." (From Section on Radiology.)
12:55 P.M.—Adjournment

ALUMNI LUNCHEONS
Tuesday, May 13, 1:00 P.M.

University of Pennsylvania — Roy B. McKnight, M.D., President, Charlotte (Warner Coffee Shop, Ocean Front at 34th Street)
Jefferson Medical College—J. S. Milliken, M.D.,

President, Southern Pines (Gay Manor Coffee Shop, on Ocean Front at 39th Street)

Medical College of Virginia—W. G. Suiter, M.D., President, Weldon (Ball Room)

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## SECTION ON GENERAL PRACTICE OF MEDICINE AND SURGERY

(Panorama Room, Beach Club)

Tuesday, May 13, 2:30 P.M.

T. W. Baker, M.D., Charlotte, Chairman

David G. Welton, M.D., Charlotte—"Management of Occupational Dermatoses."

Lester A. Crowell, Jr., M.D., Lincolnton—"The Treatment of Diabetes Mellitus." Discussion opened by G. O. Moss, M.D., Cliffside.

Thomas T. Mackie, M.D., Professor of Preventive Medicine and Director of Department of Medicine, Bowman Gray School of Medicine, Winston-Salem—"Tropical Medicine in the Temperate Zone." Discussion opened by Julian M. Ruffin, M.D., Durham.

J. Watts Farthing, M.D., Wilmington—"Atlantocranial Dislocation with Survival." Discussion opened by Donald B. Koonce, M.D., Wilmington.

Sam F. Ravenel, M.D., Greensboro—"The Treatment of Rocky Mountain Spotted Fever with Para-Aminobenzoic Acid." Discussion opened by Frank P. Ward, M.D., Lumberton.

Eugene A. Stead, Jr., M.D., Professor of Medicine, Duke University School of Medicine, Durham—"Recent Advances in Our Knowledge of Congestive Heart Failure." (Before First General Session, Tuesday, May 13.)

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## SECTION ON PUBLIC HEALTH AND EDUCATION

(Library of U. S. O.)

Tuesday, May 13, 2:30 P.M.

M. B. Bethel, M.D., Charlotte, Chairman

George T. Harrell, M.D., Director of the Department of Internal Medicine of the Bowman Gray School of Medicine, Winston-Salem—"The Integration of the Preventive Medical Aspects of Private Practice with a Public Health Program." (Before First General Session, Tuesday, May 13.)

John W. Wright, M.D., School of Public Health of the University of North Carolina, Chapel Hill—"Trends in Syphilis."

Z. M. Stadt, M.D., Director of Oral Education, Health Department, Charlotte—"Fluorination of Water Supplies."

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## SECTION ON PEDIATRICS

(Methodist Church, 18th and Pacific Avenue)

Tuesday, May 13, 2:30 P.M.

Joseph C. Knox, M.D., Wilmington, Chairman

Mary Margaret McLeod, M.D., Sanford—"Therapy of Tetanus."

E. S. King, M.D., Winston-Salem—"Routine Blood Cultures in Pediatrics." (Before First General Session, Tuesday, May 13.)

Thomas A. Henson, M.D., Greensboro—"Prematurity, with a Report of an Unusual Case."

A. H. Pate, M.D., Goldsboro—"Appetite and Schedules."

Joseph C. Knox, M.D., Wilmington—"Replacement Transfusion in Erythroblastosis Fetalis."

## SECTION ON OPHTHALMOLOGY AND OTOLARYNGOLOGY

(Baptist Church, 17th and Arctic Avenue)

Tuesday, May 13, 2:30 P. M.

Gilbert M. Billings, M.D., Morganton, Chairman

James B. Hawes, M.D., Greenville, Secretary

V. K. Hart, M.D., Charlotte Eye, Ear, Nose & Throat Hospital, Charlotte—"Extraction of Metallic Foreign Bodies from the Food and Air Passages by the Alnico Magnet and Triangulation Fluoroscopy."

Harold W. Brown, M.D., Associate Clinical Professor of Ophthalmology, New York Post Graduate Medical School and Hospital, New York—"Indications for Early Surgical Correction of Strabismus."

James C. Peele, M.D., Goldsboro Eye, Ear, Nose and Throat Clinic, Goldsboro—"Anatomical Variations of the Sphenoid Sinus."

R. Franklin Carter, M.D., Associate Attending Surgeon, Post-Graduate School and Hospital, New York—"Tumors of the Neck Encountered in General Surgical Practice." (Before First General Session, Tuesday, May 13.)

Daniel S. Currie, M.D., Department of Ophthalmology, Duke University School of Medicine, Durham—"External Diseases of the Eye." Motion Picture.

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## SECTION ON RADIOLOGY

(Episcopal Church, 18th Street on the Ocean)

Tuesday, May 13, 2:30 P.M.

G. W. Murphy, M. D., Asheville, Chairman

Stuart Gibbs, M.D., Department of Radiology, Bowman Gray School of Medicine, Winston-Salem—"Radiological Diagnosis of Patent Ductus Arteriosus."

Robert J. Reeves, M.D., Professor of Radiology, Duke University School of Medicine, Durham—"Study of Unilateral Exophthalmos."

Robert H. Hackler, M.D., Washington—"X-Ray Findings in Artificial Pneumothorax."

James E. Hemphill, M.D., Charlotte—"Vacuum Technique for Demonstration of Rupture of Medial Meniscus of Knee."

C. L. Gray, M.D., High Point—"X-Ray Examination in Rupture of the Spleen."

Allan Tuggle, M.D., and Thomas A. Murrah, M.D., Department of Radiology, Charlotte Memorial Hospital, Charlotte—"Pericolitis and Pericolonic Masses." (Before First General Session Tuesday, May 13.)

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## PRESIDENT'S NIGHT

(Dining Room and Ball Room)

Tuesday, May 13, 1947

(Dress—Optional)

7:00 P.M.—Banquet
Invocation

7:40 P.M.—Presentation of Guests

7:50 P.M.—Address—Wm. M. Coppridge, M.D., President of the Medical Society of the State of North Carolina

8:30 P.M.—Presentation of President's Jewel to Wm. M. Coppridge, M.D., Durham, by President-Elect Frank A. Sharpe, M.D., Greensboro

8:35 P.M.—Presentation of Golf Tournament Prizes

8:45 P.M.—Edmund H. Harding, Washington, N. C., The Tarheel Humorist (Humor, Philosophy, Music)

9:30 P.M.—Adjournment

10:00 P.M.—President's Ball (Panorama Room, Beach Club)

## Wednesday, May 14, 1947

8:00 A.M.—Registration Booth Opens

### SECOND GENERAL SESSION

(Panorama Room, Beach Club)

Wednesday, May 14, 1947

9:15 A.M.—Frank R. Lock, M.D., Bowman Gray School of Medicine of Wake Forest College, Winston-Salem—"Obstetrics in North Carolina." (Report of Maternal Welfare Committee for 1946.) (From Section on Gynecology and Obstetrics.)

9:35 A.M.—K. S. Grimson, M.D., Durham—"The Present Status of Vagotomy in the Treatment of Peptic Ulcer." (From Section on General Surgery.)

9:55 A.M.—Leslie B. Hohman, M.D.—"The Emotional Toll of Combat Experiences." (From Section on Neurology and Psychiatry.)

10:15 A.M.—Edward S. Orgain, M.D., Duke University School of Medicine, Durham—"Recent Advances in the Treatment of Heart Disease." (From Section on Practice of Medicine.)

10:35 A.M.—J. Edwin Wood, Jr., M.D., Department of Internal Medicine, University of Virginia, Charlottesville, Va.—Guest Speaker—"Theoretical and Practical Significance of Renal Sodium Excretion in Congestive Heart Failure."

11:15 A.M.—Raymond Hussey, M.D., Detroit, Mich.—Guest Speaker—"Human Relations Approach to Occupational Health."

11:55 A.M.—Election of Two Members of Editorial Board, **North Carolina Medical Journal**

### CONJOINT SESSION

(Panorama, Beach Club)

Wednesday, May 14, 12:00 Noon

S. D. Craig, M.D., Winston-Salem, President of the State Board of Health, will preside over this meeting of the Medical Society of the State of North Carolina and the State Board of Health.

### ALUMNI LUNCHEONS

Wednesday, May 14. 1:00 P.M.

Wake Forest—G. O. Moss, M.D., President, Cliffside (Gay Manor, Main Dining Room, on Ocean Front at 39th Street)

Duke University—Jay M. Arena, M.D., President, Durham (Warner Coffee Shop, Ocean Front at 34th Street)

University of North Carolina—George L. Carrington, President, Burlington (Ball Room)

### SECTION ON PRACTICE OF MEDICINE

(Auditorium, U. S. O.)

Wednesday, May 14, 2:30 P.M.

Sam L. Crow, M.D., Asheville, Chairman

Edward S. Orgain, M.D., Duke University School of Medicine, Durham—"Recent Advances in the Treatment of Heart Disease." (Before Second General Session, Wednesday, May 14.)

George T. Harrell, Jr., M.D., Bowman Gray School of Medicine, Winston-Salem—"Circulatory Disturbances in Acute Infections."

William B. Dewar, M.D., Raleigh—"Modern Conceptions of Disease of the Liver."

Elias S. Faison, M.D., Charlotte—"Loeffler's Syndrome."

Samuel M. Bittinger, M.D., U. S. Veterans Hospital, Oteen—"Streptomycin in the Treatment of Tuberculosis."

Horace H. Hodges, M.D., Charlotte—"Protein Hydrolysate Therapy for Peptic Ulcer."

### SECTION ON GYNECOLOGY AND OBSTETRICS

(Episcopal Church, 18th on the Ocean)

Wednesday, May 14, 2:30 P.M.

O. Hunter Jones, M.D., Charlotte, Chairman

Frank R. Lock, M.D., Bowman Gray School of Medicine of Wake Forest College, Winston-Salem—"Obstetrics in North Carolina." (Report of Maternal Welfare Committee for 1946.) (Before Second General Session Wednesday, May 14.)

Walter M. Summerville, M.D., Charlotte, and Inez Elrod, M.D., Department of Pathology, Charlotte Memorial Hospital, Charlotte—"The Clinical Application of the Quantitative Friedman Test." Discussion opened by Kenneth Cuyler, Ph.D., Department of Endocrinology, Duke University School of Medicine, Durham.

James Donnelly, M.D., Bowman Gray School of Medicine of Wake Forest College, Winston-Salem—"The Management of Prolonged Labor." Discussion opened by John H. E. Woltz, M.D., Charlotte.

H. H. Ware, Jr., M.D., Professor of Obstetrics, Medical College of Virginia, Richmond, Guest Speaker—"The Management of Breech Presentation."

W. L. Thomas, M.D., Duke University School of Medicine, Durham—"Psychosomatic Gynecology." Discussion opened by Frank A. Sharpe, M.D., Greensboro

T. Leslie Lee, M.D., and H. Fleming Fuller, M.D., Kinston—"Early Diagnosis of Uterine Malignancy." Discussion opened by Richard L. Pearse, M.D., Durham.

### SECTION ON GENERAL SURGERY

(Methodist Church, 18th and Pacific Avenue)

Wednesday, May 14, 2:30 P.M.

C. E. Gardner, Jr., Durham, Chairman

Julian Moore, M.D., Asheville—"Congenital Cysts of the Lung; Report of Two Cases." Discussion opened by J. F. O'Neill, M.D., Winston-Salem.

Felda Hightower, M.D., Winston-Salem—"Experiences in the Treatment of Lung Abscesses in the North Carolina Baptist Hospital." Discussion opened by Josiah Trent, M.D., Durham.

J. E. Jacobs, M.D., Charlotte—"The Thoracolumbar Syndrome as a Common Cause of Backache." Discussion opened by Monroe T. Gilmour, M.D., Charlotte.

R. O. Lyday, M.D., Greensboro—"Changing Concepts in the Treatment of Toxic Goiter." Discussion opened by W. H. Sprunt, M.D., Winston-Salem.

T. C. Bost, M.D., Charlotte—"Abdominal Apoplexy." Discussion opened by W. M. Summerville, M.D., Charlotte.

K. S. Grimson, M.D., Durham—"The Present Status of Vagotomy in the Treatment of Peptic Ulcer." (Before Second General Session, Wednesday, May 14.)

## SECTION ON NEUROLOGY AND PSYCHIATRY

(Baptist Church, 17th and Arctic Avenue)
Wednesday, May 14, 2:30 P. M.

Maurice H. Greenhill, M.D., Durham, Chairman

E. A. Tyler, M.D., and H. Lowenbach, M.D., Durham—"Intensive Electric Shock Treatment." Discussion opened by David A. Young, M.D., Raleigh.

Frederick H. Hesser, M.D., Durham—"Observations on Neurophysiological Aspects of Visceral Pain." Discussion opened by Keith S. Grimson, M.D., Durham.

Frederick R. Taylor, M.D., High Point—"Alcoholic Beverages and Alcoholism." Discussion opened by Thomas G. Peacock, M.D., Southern Pines.

Guy L. Odom, M.D., Durham—"Unilateral Protrusion of Cervical Intervertebral Disc." Discussion opened by Robert Graves, M.D., Durham.

Douglas M. Kelley, M.D., and Lloyd J. Thompson, M.D., Winston-Salem—"Insulin as an Adjunct in the Treatment of Anxiety States." Discussion opened by R. Burke Suitt, M.D., Durham.

Leslie B. Hohman, M.D., Durham—"The Emotional Toll of Combat Experiences." (Before the Second General Session, Wednesday, May 14.)

## THIRD GENERAL SESSION

(Ball Room)
Wednesday, May 14, 1947

5:00 P.M.—Report of House of Delegates
5:15 P.M.—Unfinished Business
5:20 P.M.—New Business
5:30 P.M.—Installation of President and President-Elect by retiring President Wm. M. Coppridge, M.D.
5:40 P.M.—Remarks by President and President-Elect
5:50 P.M.—Adjourn Sine Die

## SCIENTIFIC EXHIBITS

"Comeback" (Motion picture, rehabilitation film)—State of North Carolina, Department of Public Instruction, Division of Vocational Rehabilitation, Raleigh, N. C.

"Streptomycin"—Hugh Morgan, M.D., Nashville, Tenn., and J. M. Carlisle, M.D., Rahway, N. J.

"Protein Metabolism and Parenteral Protein Hydrolysate in Surgery"—Jacob J. Weinstein, M.D., Washington, D. C.

"Automatic Reciprocating Vacuum Dermatome" and "Pelvic Abliquity"—J. Warren White, M.D., Shriner's Hospital for Crippled Children, Greenville, S. C.

"Trichinosis"—American Medical Association, Chicago, Ill.

"The Two-Hour Pregnancy Test"—Herbert S. Kupperman, M.D., University of Georgia School of Medicine, Augusta, Ga.

"Routine Admission Chest X-ray in General Hospital"—U. S. Public Health Service, Washington, D. C.

Hospital Saving Association of North Carolina, Inc., Chapel Hill, N. C.

"Recent Development in Physical Medicine, A Community Rehabilitation Service and Center"—Baruch Committee on Physical Medicine, New York, N. Y.

North Carolina Mental Hygiene Society

"Tropical Ulcers"—The Institute of Inter-American Affairs, Division of Health and Sanitation, Washington, D. C.

Hospital Care Association, Durham, N. C.

The North Carolina Dairy Council, Durham, N. C.

## TECHNICAL EXHIBITORS

A. S. Aloe Company, St. Louis, Mo., Spaces Nos. 71 and 72
Ayerst, McKenna & Harrison, Ltd., New York, N. Y., Space No. 53
Borden Company, New York, N. Y., Spaces Nos. 20 and 21
Camel Cigarettes, New York, N. Y., Spaces Nos. 32 and 33
Carolina Surgical Supply Co., Raleigh, N. C., Spaces Nos. 15 and 16.
Ciba Pharmaceutical Products, Inc., Summit, N. J., Spaces Nos. 61 and 62
Commercial Casualty Insurance Company, Durham, N. C., Space No. 56
Doak Company, Inc., Hyattsville, Md., Spaces Nos. 78 and 79
Doho Chemical Corporation, New York, N. Y., Spaces Nos. 28 and 29
Drug Specialties, Inc., Winston-Salem, N. C., Space No. 68
Eli Lilly and Company, Indianapolis, Ind., Spaces Nos. 51 and 52
C. B. Fleet Company, Inc., Lynchburg, Va., Space No. 18
General Electric X-Ray Corporation, Charlotte, N. C., Space No. 37
Charles C. Haskell & Company, Richmond, Va., Spaces Nos. 34 and 35
Holland-Rantos Company, Inc., New York, N. Y., Spaces Nos. 40 and 41
Lanteen Medical Laboratories, Inc., Chicago, Ill., Spaces Nos. 47 and 48
Lederle Laboratories, New York, N. Y., Space No. 70
J. B. Lippincott Company, Philadelphia, Pa., Space No. 69
Mead Johnson & Company, Evansville, Ind., Space No. 19
Wm. S. Merrell Company, Cincinnati, Ohio, Spaces Nos. 38 and 39
Nutrition Research Laboratories, Chicago, Ill., Spaces Nos. 42 and 43
Ortho Pharmaceutical Corporation, Linden, N. J., Spaces Nos. 80 and 81
Parke, Davis & Company, Detroit, Mich., Spaces Nos. 30 and 31
Philip Morris & Company, Ltd., Inc., New York, N. Y., Spaces Nos. 63 and 64
Picker X-Ray Corporation, New York, N. Y., Space No. 54
Poloris Company, Inc., Jersey City, N. J., Spaces Nos. 65 and 66
Powers and Anderson of North Carolina, Inc., Winston-Salem, Space No. 36
William P. Poythress & Company, Inc., Richmond, Va., Spaces Nos. 45 and 46
S. & H. X-Ray Corporation, Charlotte, N. C., Spaces Nos. 57 and 58
Schering Corporation, Bloomfield, N. J., Spaces Nos. 59 and 60
G. D. Searle and Company, Chicago, Ill., Spaces Nos. 49 and 50
Sharpe & Dohme, Philadelphia, Pa., Spaces Nos. 22 and 23
Southeastern Optical Company, Richmond, Va., Space No. 1
E. R. Squibb & Sons, New York, N. Y., Spaces Nos. 2 and 3
Tablerock Laboratories, Inc., Greenville, S. C., Space No. 73
U. S. Vitamin Corporation, New York, N. Y., Spaces Nos. 4 and 5
Valentine's Meat-Juice Company, Richmond, Va., Space No. 44
VanPelt & Brown, Inc., Richmond, Va., Spaces Nos. 13 and 14
Walker Vitamin Products, Inc., Mount Vernon, N. Y., Spaces Nos. 82 and 83
White Laboratories, Inc., Newark, N. J., Spaces Nos. 24 and 25
Winchester Surgical Supply Company, Charlotte, N. C.
Winchester-Ritch Surgical Company, Greensboro, Spaces Nos. 6, 7, 8, 9, 10, 11
Winthrop Chemical Company, New York, N. Y., Spaces Nos. 26 and 27
World Insurance Company, Winston-Salem, N. C., Space No. 17
Zimmer Manufacturing Company, Warsaw, Ind., Space No. 74

## NORTH CAROLINA ORTHOPEDIC ASSOCIATION

The North Carolina Orthopedic Association will hold its annual meeting at the Pinewood Hotel, Virginia Beach, Va., on May 12. The meeting will convene at 10 a.m.

## NEWS NOTES FROM THE STATE BOARD OF HEALTH

December's 11,151 live births—the largest number for any month on record—brought North Carolina's total for 1946 to 100,595. This is not only an all-time record, but is 5,344 in excess of the previous all-time high, scored in 1943.

The number of births in North Carolina last year was **more than three times** the number of deaths, of which 29,224 were reported in 1946. Diseases of the heart, intracranial vascular lesions, nephritis, and cancer claimed 15,526 of these victims. There were 6,903 deaths from heart disease, 3,171 from intracranial vascular lesions, 2,891 from nephritis, and 2,581 from cancer. Accidents were responsible for 2,264 deaths, the majority of which might have been prevented. Automobile accidents claimed 998 victims, while 1,264 died as the result of other accidents.

Only 53 children died of diphtheria, as compared with 95 in 1945. There were only 57 deaths from whooping cough reported in the state last year, as compared with 92 the preceding year. The number of influenza deaths in North Carolina last year was about the same as that for 1945, but pneumonia deaths showed an appreciable decline—1,376 as compared with 1,540 the year before. Pulmonary tuberculosis claimed 1,065 victims in North Carolina in 1946, as compared with 1,287 the previous year—a gratifying decrease. There were only 10 deaths from typhoid fever in North Carolina last year.

The maternal death rate for 1946 reflects a real gain. With 88,597 live births in 1945, there were in North Carolina 274 maternal deaths. As the result of 100,595 live births during 1946, there were only 204 maternal deaths—a decrease of 70, notwithstanding an increase of 12,003 live births.

There were only 3,814 deaths among babies under a year old, as compared with 3,842 in 1945, when 12,003 fewer babies were born.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

With still a few days to go until the closing of the books on the 40th Annual Christmas Seal Sale, reports show that the goal of $300,000 for the state has already been surpassed, setting a new record for North Carolina. The last report made to the State office shows that the sale is approaching $325,000 and at the end of the sale may surpass this figure.

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The Planning Committee on Program for the NCTA Annual Meeting met in Raleigh on February 18, and selected Goldsboro as the place for the 1946 Annual Meeting. No definite date for the meeting was set, but the committee voted to hold it some time between May 8 and May 15, the exact date to be decided upon after hotel accommodations and the availability of speakers has been determined.

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

The National Research Council recently announced that Dr. Jerry K. Aikawa, a graduate of the Bowman Gray School of Medicine, and now a member of the staff of the Department of Medicine, has been awarded a year's fellowship in medical sciences. In September Dr. Aikawa will go to Berkeley, California, for further study in bacteriology and immunology with the Hooper Foundation in the Department of Medicine at the University of California. Dr. Aikawa plans to remain in Winston-Salem until September, in order that he may continue his research in spotted fever.

* * * *

On April 3, 1947, approximately 115 visitors from Wake Forest College visited Winston-Salem and were entertained at a luncheon by the faculty of the Bowman Gray School of Medicine and the staff of the North Carolina Baptist Hospital. Following the luncheon the guests visited the proposed site of the Wake Forest College buildings in Reynolda Estate, as well as the site on Graylyn Estate where the Bowman Gray School of Medicine and the North Carolina Baptist Hospital will be relocated.

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Dr. Manson Meads assumed his duties as instructor in the Department of Medicine in late March. Dr. Meads is a native of Oakland, California. He received his A.B. degree from the University of California, and obtained his medical education at Temple University School of Medicine. Following his internship in the University of California Hospital, he served a residency at the Permanente Foundation Hospital in Oakland. He was awarded a research fellowship in medicine at Thorndike Memorial Laboratory and Harvard Medical School, where he served part of his time as resident physician. Dr. Meads has done outstanding research in the use of penicillin, streptomycin, and the sulfa drugs.

* * * *

Mr. C. J. Jackson, director of the Wake Forest College Enlargement Program, has set up the Winston-Salem office for conducting the campaign throughout North Carolina. Mr. Jackson will conduct the joint campaign for funds for the new hospital and medical school at Graylyn and for the new Wake Forest College Buildings on the Reynolda site. The program was approved at a meeting of the General Board of the North Carolina Baptist State Convention in March.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

The following promotions and new appointments have recently been announced:

**Promotions**

Dr. J. W. Beard—Professor of Surgery in charge of Experimental Surgery
Dr. N. F. Conant—Professor of Mycology and Associate Professor of Bacteriology
Dr. W. J. Dann—Professor of Nutrition
Dr. C. E. Gardner—Clinical Professor of Surgery
Dr. Leslie B. Hohman—Professor of Neuropsychiatry
Dr. W. H. Hollinshead—Professor of Anatomy
Dr. D. S. Martin—Professor of Public Health and Associate in Medicine
Dr. Hans Neurath—Professor of Biophysical Chemistry
Dr. J. W. Everett—Associate Professor of Anatomy
Dr. Hans Lowenbach — Associate Professor of Neuropsychiatry and Associate Professor of Physiology
Dr. W. M. Nicholson—Associate Professor of Medicine

- Dr. E. L. Persons—Director of Student Health, Assistant Professor of Medicine, and Associate Professor of Public Health and Preventive Medicine
- Dr. Ralph Arnold—Assistant Professor of Otolaryngology and Ophthalmology
- Dr. Otto Billig—Assistant Professor of Neuropsychiatry
- Dr. K. L. Duke—Assistant Professor of Anatomy
- Dr. Grant Taylor—Assistant Professor of Bacteriology, Assistant Professor of Pediatrics, and Assistant Dean
- Dr. James G. Whildin—Assistant Professor of Radiology

**New appointments**

- Dr. George F. Sutherland—Visiting Assistant Professor of Neuropsychiatry
- Dr. F. L. Engel—Associate in Medicine
- Dr. M. Bolus—Instructor in Dermatology and Syphilology
- Dr. E. Bugg—Instructor in Orthopedics
- Dr. J. B. Hickam—Instructor in Medicine
- Dr. J. Hitch—Instructor in Dermatology and Syphilology
- Dr. J. D. Myers—Instructor in Medicine
- Dr. Benjamin Skinner—Instructor in Pediatrics
- Dr. Charles Styron—Instructor in Medicine
- Dr. K. D. Weeks—Instructor in Medicine
- Dr. Walter Cargill—Fellow in Medicine
- Dr. J. E. Jacobs—Lecturer in Orthopedics

## SECOND DISTRICT MEDICAL SOCIETY

The Second District Medical Society held its meeting at the Plymouth Country Club as the guest of the Washington-Martin-Tyrrell Counties Society on March 12, 1947. The meeting was presided over by the president of the society, Dr. J. S. Rhodes, Sr. Dr. R. H. Ross of the Duke University Hospital made an interesting talk on "Maternal Mortality in North Carolina." Dr. W. L. Thomas, obstetrician, of the Duke University Hospital, also made a short talk. Dr. Frank Sharpe, president-elect of the North Carolina Medical Society, was present and made an interesting talk on general business of the Medical Society.

A delicious supper was served by the hosts, and after routine business was taken up the Second District Medical Society was invited by the Craven County Medical Society to have the next meeting in New Bern. This invitation was accepted, and Dr. William Willis of New Bern was elected president of the society, with Dr. Frank Grady as secretary and treasurer. Dr. John C. Tayloe of Washington is councilor of the Second District.

## ASHE-WATAUGA COUNTIES MEDICAL SOCIETY

A dinner meeting of the Ashe-Watauga Counties Medical Society was held in Boone on March 19. Dr. Robert R. King, Jr., gave a report on "Epidemic Ringworm of the Scalp in This and Other States," and Dr. R. H. Harmon spoke on "Military Medical Experiences in the South Pacific."

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. Douglas M. Kelley, associate professor of neuropsychiatry at the Bowman Gray School of Medicine, spoke to the Forsyth County Medical Society at its meeting on March 11. His subject was "Psychiatric Observations of the Nuremburg Nazis."

## HALIFAX COUNTY MEDICAL SOCIETY

The monthly meeting of the Halifax County Medical Society was held on March 14 in Roanoke Rapids. Dr. R. L. McMillan of the Bowman Gray School of Medicine, Winston-Salem, spoke on "Treatment of Cardiac Irregularities."

## PITT COUNTY MEDICAL AND DENTAL SOCIETY

### Resolutions of Appreciation

Be it resolved that the Pitt County Medical and Dental Society hereby gives the following expressions of appreciation of the services of Dr. N. Thomas Ennett to Pitt County, and of regrets that he has deemed it to his best interest to resign from the services of the county.

The members of the Society unanimously commend Dr. Ennett for his untiring service in behalf of the public health of Pitt County. They always found in him a leader in any movement looking toward the betterment of public health, always cooperative and sympathetic with the members of the medical and dental professions and, indeed, a man who could well coordinate the public and private practice of medicine.

Under Dr. Ennett the Health Department made notable records in the fields of venereal disease control, sanitation, maternal welfare; and in tuberculosis, typhoid fever, and diphtheria control. His leadership in the Tuberculosis Seal Sale resulted in great increases in contributions, and his wise use of these funds essentially for case finding has done much toward decreasing the spread of this disease in Pitt County.

During his tenure as Pitt County Health Officer, Dr. Ennett was honored with the presidency of the Pitt County Medical and Dental Society and the presidency of the North Carolina Public Health Association.

After twelve years of association with a man of such culture, honesty, friendliness, faithfulness to duty, and professional ability as Dr. N. Thomas Ennett, it would be impossible to view his leaving without a deep sense of personal loss and a feeling that Pitt County has lost both a valued citizen and servant. It is the wish of the entire membership of the Society that in his new work Dr. Ennett may find great satisfaction and happiness.

(Signed) F. P. BROOKS, M.D.
J. M. MEWBORN, M.D.
C. F. IRONS, M.D.

## NEWS NOTES

Drs. William Ray Griffin and M. A. Griffin have announced that Appalachian Hall, a sanatorium for the treatment of nervous and mental disorders, has returned to its own building in Asheville. For the past three years this building has been used by the navy as a convalescent hospital.

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Dr. William F. Cox has opened offices in Winston-Salem for the practice of internal medicine.

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Dr. Edward J. Wannamaker of Charlotte has announced the association of Dr. William Harding Kneedler in the practice of internal medicine. Dr. Kneedler is a diplomate of the American Board of Internal Medicine and a Fellow of the American College of Physicians.

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Dr. John J. Tyson, formerly of Ayden, is now chief of surgical service in the Veterans Administration Hospital at Fargo, North Dakota.

(BULLETIN BOARD CONTINUED ON PAGE 263)

# AUXILIARY

As Chairman of Public Relations, I have tried to get the auxiliaries to cooperate in every way possible with the health program of the state. There are many ways in which this may be done. The Red Cross work and drive, nurses' aides and hospital hostesses, the tuberculosis and cancer drives, all furnish excellent opportunities for cooperation. Most of the auxiliaries have done a splendid job of helping with these projects.

At the Executive Board meeting at Sanatorium in the fall several subjects were discussed which need the study and cooperation of the doctors and their wives. These were recommended as suitable topics for programs. Mecklenburg County Auxiliary has used juvenile delinquency, mental hygiene, the nursing problem, health education, new development in medicine, and other subjects for discussion at its meetings. These programs have been most interesting and helpful.

Two programs were devoted to the study of the nursing profession and the problems which have followed the war. The shortage of nurses, salaries, hours, cooperation between the medical profession and the nursing profession, and many other phases were discussed, with the hope that some of the problems could be solved by better understanding among the nurses, doctors, and hospital authorities.

We are pleased with the recent passage of the good health program in our state, and feel that it will be a great step forward in the health of our citizens as the program is developed in the coming years.

MRS. JOHN P. KENNEDY
2026 Providence Road
Charlotte

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### TWENTY-FOURTH ANNUAL MEETING OF THE

## AUXILIARY TO THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

### RULES AND PROCEDURE

Register on arrival and receive badge. ($1.00 fee* for all who do not present current membership card.)

Wear BADGE to all functions.

### PROGRAM

Monday, May 12, 1947

8:30 P.M.—Bridge and Prizes (Panorama Room)

Tuesday, May 13, 1947

9:00 A.M.—Executive Board Meeting (Hunt Room)
11:00 A.M.—Annual Meeting (Hunt Room)
4:00 P.M.—Reception (Hunt Room) (Honoring Mrs. Frederick R. Taylor, President; Mrs. Wm. M. Coppridge, wife of President of Medical Society; Mrs. Roscoe D. McMillan, wife of Secretary-Treasurer of Medical Society; Mrs. W. Reece Berryhill, President-Elect; Mrs. Frank A. Sharpe, wife of President-Elect of Medical Society; Mrs. Stuart Willis, wife of Superintendent of the three State Sanatoriums, and other guests of the Society.)
7:00 P.M.—Banquet (Cavalier Dining Room and Ball Room)
10:00 P.M.—Annual Ball (Panorama Room, Beach Club)

Wednesday, May 14, 1947

10:30 A.M.—Coca-Cola Hour (Hunt Room)

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### GENERAL MEETING

Tuesday, May 13, 1947, 11:00 A.M.
Hunt Room
Mrs. Frederick R. Taylor, President, Presiding

### PROGRAM

- Call to Order........................Mrs. Frederick R. Taylor, President, High Point
- Invocation..........Mrs. Wingate M. Johnson, Winston-Salem
- Memorial Services................Mrs. Ira C. Long, Goldsboro
- Reports of Executive Officers:
  - First Vice-President
  - Chairman of Organization...........Mrs. Erick Bell, Wilson
    - Introduction of District Councilors
    - Introduction of County Auxiliary Presidents
  - Second Vice-President
    - Chairman of Activities...Mrs. B. Watson Roberts, Durham
  - Chairman of McCain Bed.........Mrs. Wm. P. Richardson, Chapel Hill
  - Chairman of Stevens Bed....Mrs. G. M. Billings, Morganton
  - Chairman of Cooper Bed__Mrs. M. I. Fleming, Rocky Mount
  - Chairman of Student Loan Fund......Mrs. F. Norman Bowles, Durham
  - Corresponding Secretary........Mrs. C. L. Gray, High Point
  - Recording Secretary..........Mrs. Charles H. Gay, Charlotte
  - Treasurer..........................Mrs. E. C. Judd, Raleigh
  - President..............Mrs. Frederick R. Taylor, High Point
  - Chairman of Past Presidents.........Mrs. P. P. McCain, Southern Pines
- Report of Chairman of Advisory Board....................Dr. Rachel Davis, Kinston
- Introduction of Standing Committees
- Report of Chairman of Revision Committee.........Mrs. J. B. Sidbury, Wilmington
- Recommendations from Board of Directors by Recording Secretary..........Mrs. Charles H. Gay, Charlotte
- Report of Councilor from Southern Medical Auxiliary............Mrs. Clyde R. Hedrick, Lenoir
- Greetings from the Medical Society of the State of North Carolina..Dr. Wm. M. Coppridge, President, Durham
- Report from the American Medical Auxiliary..Mrs. John P. Kennedy, Delegate, Charlotte
- Announcement of Awards.....Mrs. Joseph A. Elliott, Charlotte
- Presentation of Awards..............Mrs. E. C. Judd, Raleigh
- Unfinished Business
- New Business
- Election of Delegates to National Auxiliary
- Report of Nominating Committee.........Mrs. Robert L. McMillan, Winston-Salem
- Installation of Officers.....Mrs. P. P. McCain, Southern Pines
- Inaugural Remarks......Mrs. W. Reece Berryhill, Chapel Hill
- Announcements
- Adjournment

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**A few more months and the members of the Woman's Auxiliary to the American Medical Association will be arriving in Atlantic City, New Jersey, for their Annual Convention—June 9-13.**

**Have you made your reservations? If not, send your request at once to Dr. Robert A. Bradley, Chairman, Subcommittee on Hotels, 16 Central Pier, Atlantic City, New Jersey.**

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*Fifty cents for Auxiliary expenses and dues to Auxiliaries to Southern Medical and American Medical Associations, and 50c for upkeep of three beds at State Sanatoria maintained for doctors, doctors' families, nurses, children and others.

# BOOK REVIEWS

**Human Genetics.** By Reginald Ruggles Gates, Ph.D., LL.D., F.R.S., Emeritus Professor of Botany, University of London; Chairman, Bureau of Human Heredity, London. Two volumes, 1518 pages, with 326 illustrations and 42 tables. Price, $15.00. New York: The Macmillan Company, 1946.

Dr. Gates has been a careful student of human genetics for many years, and his present work is an expansion and complete revision of his previous publications in this field. His monograph **Heredity in Man**, published in 1929, summarized most of the important work up to that date. Knowledge of human inheritance, both pathologic and non-pathologic, has increased very rapidly within the past twenty years, and the present two-volume work is an attempt to summarize and codify a vast amount of work in many special fields.

Although this book is intended to be primarily a reference work, the author avoids the dryness and terseness of style which characterize many publications of this type. Each section is remarkably well integrated, considering the vast amount of source material that had to be summarized and correlated. Thirty-one chapters are included, the first four dealing with the general principles of genetics as they apply to man. This section will probably be considered incomplete by many geneticists, but it is the opinion of the reviewer that a short and concise presentation of basic principles such as Dr. Gates has given will be of much more use to physicians than a synopsis of the more formal and conventional exposition usually given in genetics textbooks. This introduction is followed by a systematic review of the known hereditary diseases, grouped by systems. The approach to each disease is primarily genetic, but the clinical features of each condition are also briefly summarized. Included with the more strictly pathologic traits is a discussion of the inheritance of related non-pathologic variations, such as eye color, blood groups, and various anthropologic characters.

Each chapter is followed by a list of references to key papers in the literature, and the list of such references for a single chapter frequently occupies ten or more pages. These references have been so selected and arranged that one may find direct reference to the most important papers on any given subject, and reference is usually given to papers which in turn give complete summaries of the literature. Volume II contains a very full index of both subjects and authors cited, and the index alone occupies ninety pages.

It is the opinion of the reviewer that this work represents the most complete summarization of the field of medical genetics that has been yet made available, and that it fills a most urgent need for an adequate reference work in this rapidly expanding branch of medicine.

**Operative Gynecology.** By Richard W. Te Linde, M.D., Professor of Gynecology, Johns Hopkins University, Chief Gynecologist, Johns Hopkins Hospital. 725 pages. Price, $18.00. Philadelphia: J. B. Lippincott Company, 1946.

This volume represents a careful collection of the operative techniques used in the department of gynecology of Johns Hopkins University Hospital. A total of 309 illustrations in black and white and 15 subjects in full color clearly and precisely illustrate each of the techniques presented. Dr. Te Linde expresses his wish to bring the subject of operative gynecology up to date and to make available recent information on this subject in a single volume. The views expressed are his and in general those put into practice on the gynecologic house service at Johns Hopkins Hospital.

For the benefit of those who require self-instruction in addition to their formal operative training, the technique of each operation is described in minute detail. The diagnosis, indications, and contraindications for each of the operative procedures are carefully considered. The management of postoperative complications is fully discussed.

A full chapter is devoted to anesthesia in gynecology; the indications and contraindications for each anesthetic method, as well as a minute description of the technique for each method, are included.

This volume can be enthusiastically recommended to anyone who performs pelvic surgery. It is a fine contribution to the gynecologic literature, and the first recent American presentation on this important subject.

**Management in Obstetric Complications.** Edited by Clifford B. Lull, M.D. 225 pages. Price, $4.00. Philadelphia: J. B. Lippincott Company, 1945.

This monograph represents a collection of special articles prepared as a symposium on specific obstetric problems which appeared in **Clinics**, for October, 1945. Each of the nineteen contributors (who include Dr. Oren Moore of Charlotte, North Carolina) has written a comprehensive article on some special problem in obstetrics to permit the general practitioner or specialist to review the subject briefly but in a thorough manner. The subjects include toxemia of pregnancy, ectopic pregnancy, abortion, complications of the third stage of labor, surgical complications of pregnancy, puerperal infection, management of some abnormal presentations, infections of the vagina during pregnancy, and placenta previa and premature separation of a normally situated placenta.

In general the monograph fulfills its purpose, and the articles are excellent. Certain specific interests of the authors are reflected. The section on toxemia of pregnancy is written by Foster Kellogg, who outlines the use of the Harvard (Boston Lying-In) routine employing veratrone for the management of eclampsia and severe pre-eclampsia.

In the section on vaginal infections Dr. J. B. Bernstine suggests only gentian violet for the treatment of moniliasis in pregnancy, and in the final chapter, by Dr. R. L. Barrett, the use of anterior pituitary extract is recommended on pages 222 and 224, when it is obvious that the author intended to recommend **posterior** pituitary extract.

The monograph is a useful collection of comprehensive articles and can be recommended to general practitioners and obstetricians.

**Uterotubal Insufflation; A Clinical Diagnostic Method of Determining the Tubal Factor in Sterility Including Therapeutic Aspects and Comparative Notes on Hysterosalpingography.** By I. C. Rubin, M.D., F.A.C.S., Clinical Professor of Gynecology, College of Physicians and Surgeons, Columbia University; Consulting Gynecologist, Mount Sinai Hospital; Visiting Gynecologist, Montefiore Hospital; Consulting Gynecologist, Beth Israel Hospital, New York. 453 pages, with 159 illustrations, including 4 in color. Price, $8.00. St. Louis: The C. V. Mosby Company, 1947.

Dr. Rubin is generally credited with originating the diagnostic method of tubal insufflation, and the procedure bears his name. This volume is an authoritative compilation of all the literature which has appeared on this subject since it was introduced in 1914.

The book is divided into five principal parts. The first describes the anatomy, pathology, and physiology of the fallopian tubes. The second is on the technique of tubal insufflation and the diagnostic possibilities. The third part discusses therapy with the method. The fourth is a comparison of the kymographic insufflation method and intrauterine injection of iodized oil. Part five consists of a bibliography, appendix, and index.

Few, if any, details of the available knowledge concerning the fallopian tubes are omitted in the text, and the methods used for the study of tubal physiology are fully discussed in the first section of the book.

The technique of tubal insufflation and diagnosis is considered in detail, and the indications and contraindications for the use of the method are minutely considered. The use of the procedure to determine the advisability of any operation designed for the relief of sterility, and the types of operations which may be used are discussed at some length. The pitfalls which may occur in the interpretation of the findings are clearly set forth. The therapeutic aspects of infertility are fully treated, and numerous brief case reports are included to illustrate the significant points.

This volume represents a fine contribution to the gynecologic literature and to the great problem of infertility which exists in America. It should be carefully read by any person employing this diagnostic method, since it includes practically all of the published data and a considerable amount of material which has been hitherto unpublished by the author. The reviewer is not in full agreement with Dr. Rubin about the value of corrective operations; however, a balanced presentation of the material permits personal interpretation. It is an excellent source book, and Dr. Rubin is to be congratulated upon its preparation and presentation.

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**Musical Sons of Aesculapius.** By Willard Marmelszadt, M.D. 112 pages. Price, $3.00. New York: Froben Press, 1946.

This small book briefly reviews the lives of the more famous physicians who also made names for themselves in the field of music. Included are their contributions to the classics, to popular and jazz music, and their work as composers, as skilled players of musical instruments, and as patrons and supporters of well known musical societies.

Victor Robinson in the Foreword describes this volume as "the crossing of the scalpel and the baton." It is a very readable book for those who are interested in the history of medicine.

**The Story of Human Birth.** By Alan Frank Guttmacher, M.D., Associate Professor of Obstetrics, Johns Hopkins University; Visiting Obstetrician, Johns Hopkins Hospital; Chief of Obstetrics, Sinai Hospital, Baltimore. 201 pages. Price, 25¢. New York: Penguin Books, Inc., 1947.

This book, originally published by The Viking Press in 1935 under the title **Into This Universe**, has been brought up to date and is presented in a pocket-sized edition for expectant mothers and fathers, and adult readers.

Dr. Guttmacher has presented a technical subject in a most interesting and pleasing manner. The completeness with which he covers the subject should leave very little to the imagination of the average layman; in fact, one might question if he has not been too thorough in his vivid portrayal of birth, including the technique of forceps and cesarean section.

This book might well be used as an introduction to obstetrics for student nurses, and is also highly recommended to medical students and young practitioners alike.

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## Book Catalogue

The Grune and Stratton book catalogue for 1947 has just been released. It includes about 95 of the firm's recent publications and about 100 books in German and French which were imported from Switzerland, France, and Austria. This is the first time that the American medical profession has had a possibility of checking the list of foreign publications available so far.

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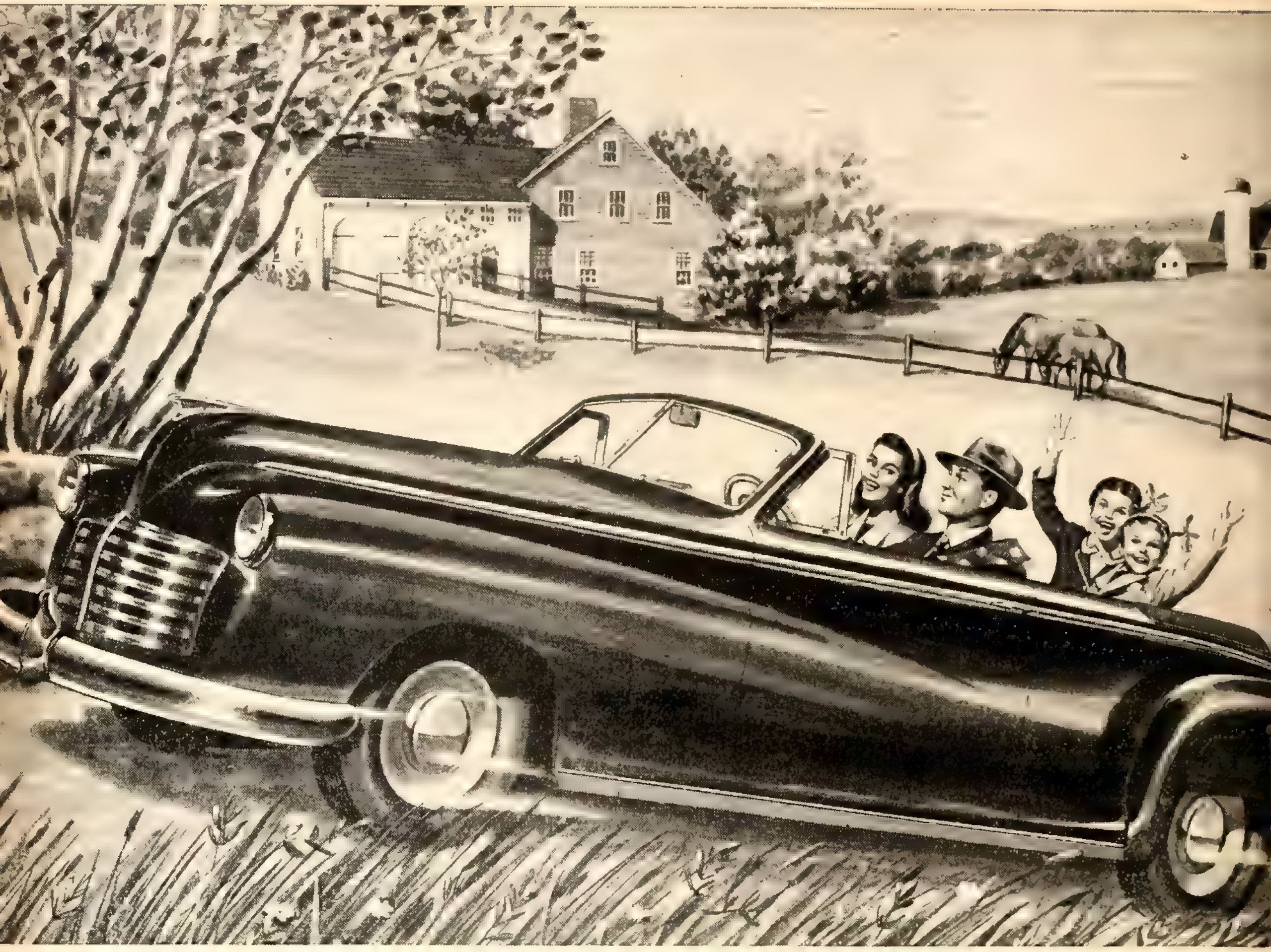
## The Hebrew Medical Journal

**Harofe Haivri** (The Hebrew Medical Journal) which is dedicated to the continued growth of Hebrew medical literature, has concluded its nineteenth year of successful publication, under the editorship of Moses Einhorn, M.D. of New York.

The medical section of Volumes I and II, 1946 contain the following articles: "Renal Lithiasis and Its Treatment" and "Urinary Tract Infections" by Abraham Hyman, M.D., "The Menopause, an Endocrine Dysfunction" by Raphael Kurzrok, M.D., and "The Present Conception of the Treatment of Anemias" by Gershon Ginzburg, M.D. Dr. M. Sherman of Tel Aviv writes on the Palestine Jewish Medical Association (PJMA) of which he is the president. This association was organized in 1912 with a membership of eleven physicians. Today, its members number 2300. Its functions are similar to the A.M.A. activities in America. The Association does not limit its activities and interests to scientific and professional matters. It is equally concerned with the health problems of the population of the country.

Editorial Office: The Hebrew Medical Journal, 983 Park Avenue, New York 28, N. Y.



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Even after the gas gauge says "empty" a modern car can keep going for a good many miles. Here's why.

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**So keep on buying Bonds** on the Payroll Plan. Buy all the extra Bonds you can, at any bank or post office. And remember, you're helping your country as well as yourself —for every Bond you buy plays a part in keeping the U. S. strong and economically sound!

**ave the easy way..buy your bonds through payroll saving**

# BULLETIN BOARD

(CONTINUED FROM PAGE 258)

## JEFFERSON MEDICAL COLLEGE ALUMNI ASSOCIATION

Dr. George T. Wood of High Point has been elected vice president of the Jefferson Medical College Alumni Association for the state of North Carolina.

Clinics for alumni will be held in Philadelphia on May 21 and 22, and there will be a dinner at the Ben Franklin Hotel in Philadelphia on May 22. In addition, alumni are invited to a smoker on June 11, at the Traymore Hotel in Atlantic City, during the meeting of the A.M.A.

## REFRESHER COURSE IN GENERAL MEDICINE

The University of Virginia Department of Medicine is offering a two-week Refresher Course in General Medicine at the University of Virginia, Charlottesville, Virginia, May 19-31, 1947. The University of Virginia and the Medical Society of Virginia take great pleasure in inviting the members of the Medical Societies of North Carolina and West Virginia to participate in this course. No tuition fee will be charged registrants.

Any physician in North Carolina who is interested in attending this course should write at once to Dr. S. D. Blackford, University of Virginia Hospital, Charlottesville, Virginia, stating what days he plans to attend and whether he would like arrangements made for his accommodations while he is in Charlottesville. Applicants should give name, address, year and place of graduation, what line of practice they are engaged in, and any special medical interests.

## NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The National Gastroenterological Association will hold its twelfth Annual Convention and Scientific Sessions at the Hotel Chelsea in Atlantic City, N. J. on June 4, 5, 6, 1947. The program will consist of eighteen separate papers on various phases of gastroenterology and allied subjects.

Program and further details may be obtained from the National Gastroenterological Association, 1819 Broadway, New York 23, N. Y.

## AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS

The Thirty-Second Annual Convention of the American Association of Industrial Physicians and Surgeons is to be held in Buffalo, N. Y., the week of April 27-May 3, 1947, with headquarters at the Statler Hotel.

## JANE TODD CRAWFORD STUDENT LOAN FUND IN GYNECOLOGY

The Woman's Auxiliary to the Southern Medical Association has established a loan fund for young Southern physicians wishing to pursue the study of gynecology. The requirements are simple: he or she must not be over 32, of good character, and showing evidence of being capable of absorbing adequate knowledge. The loan, of course, must be returned in small installments after completion of the study.

Inquiries may be addressed to Mrs. J. Ullman Reaves, 1862 Government Street, Mobile 18, Alabama.

## ATTENTION NAVAL RESERVE MEDICAL OFFICERS!

The attention of Reserve Medical Officers is invited to the opportunity to return to **active duty** at one of the major naval air stations of the Naval Air Reserve Training Command or at one of the Naval Air Reserve Training Units (NARTUs) listed below:

NAS Atlanta, Ga.
NAS Columbus, Ohio
NAS Denver, Colo.
NAS Dallas, Texas
NAS Glenview, Ill.
NAS Grosse Ile, Mich.
NAS Los Alamitos, Cal.
NAS Memphis, Tenn.
NAS Miami, Fla.
NAS Minneapolis, Minn.
NAS New Orleans, La.
NAS New York, N. Y.
NAS Oakland, Calif.
NAS Olathe, Kas.
NAS Squantum, Mass.
NAS St. Louis, Mo.
NAS Willow Grove, Pa.
NARTU, NAS Anacostia, D. C.
NARTU, NAS Jacksonville, Fla.
NARTU, NAS Norfolk, Va.
NARTU, NAS Seattle, Wash.

Reserve Medical Officers who are interested in **active duty** at one of the stations or units listed above should initiate letters to the Bureau of Naval Personnel, via Chief of Naval Air Training, Naval Air Station, Glenview, Ill., and BuMed, listing three or four stations at which duty is desired in order of preference. Personnel are desired in rank of Commander and below in the Medical Corps. However, Captains may apply for duty in their rank, requesting waiver.

Officers qualifying for the above billets will not be subject to transfer and may terminate the tour of duty at own request. Flight Surgeons are assured of orders to duty involving flying. Government quarters are available at several of the major naval air stations. **Here is a chance for a reserve officer awaiting residency or fellowship in a civilian hospital to obtain a full-time paying job in the meantime.**

Naval Reserve Flight Surgeons who desire to join one of the Navy or Marine combat air groups of the Organized Reserve training at one of the stations listed above should contact the local Commanding Officers for additional information. Two months pay per year is granted for attendance at all training periods.

## FEDERAL SECURITY AGENCY

Medical Research grants amounting to more than two million dollars have been recommended for the approval of Dr. Thomas Parran, Surgeon General, United States Public Health Service, by the National Advisory Health Council. Grants are contingent upon appropriations by the Congress for the fiscal year 1948 which begins July 1, 1947.

Of the 193 grants that supplement existing funds of universities and other research institutions, the largest, $105,800, was recommended for a study of syphilis by the Pan American Sanitary Bureau. Sums of $52,454 and $46,000 respectively, were slated for the study of malaria by the University of Chicago and Christ Hospital, Cincinnati, Ohio. Six other grants were above a $30,000 level. Dr. Hans Neurath of Duke University received a grant of $14,120, and Dr. Wm. A. Perlzweig, also of Duke, a grant of $5,775. A grant of $4,000 went to Dr. George Harrell, of the Bowman Gray School of Medicine.

(BULLETIN BOARD CONCLUDED ON PAGE 266)

Nourishment AS THEY LIKE IT BEST

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The Tennessee Valley Authority announces openings in its Health and Safety Department for well qualified physicians. Training and experience in public health and employee medical services are desirable.

The entrance salary is $4950 per annum, based on a 40-hour week schedule with provision for within grade increases to $5900. Retirement, annual, and sick leave benefits are provided.

Interested candidates should write the Tennessee Valley Authority, Personnel Department, Knoxville, Tennessee.

### Winthrop Opens New "Dustless" Scientifically Run Ampule Building

A new four-story brick and glass, windowless, germ- and dust-proof laboratory plant designed to be run under constant scientific control for the preparation of injectible medicine in ampules was opened in Rensselaer, New York, recently by the Winthrop Chemical Company, Inc.

Dr. Theodore G. Klumpp, president, put the building into full operation without any formal ceremony, other than issuing a statement describing it as "an advance in the art of pharmaceutical manufacture." Engineers of the Austin Company, who built it starting in May, 1945, characterized the completed job as a "scientific utopia" and "one of the most complex and intricate examples of controlled-conditions buildings to be seen anywhere."

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# BULLETIN BOARD

(CONTINUED FROM PAGE 263)

## CIVIL SERVICE APPOINTMENTS

An examination has been announced by the Civil Service Commission for filling Medical Officer positions in various fields of medicine.

The positions are located in various Federal agencies, in Washington, D. C.; in the U. S. Public Health Service and the Indian Service, throughout the United States; and in the Panama Canal Service, in the Panama Canal Zone. The salaries range from $4,149 to $5,905 a year, with higher salary rates for the Canal Zone positions.

No written test will be given for these Medical Officer positions. To qualify, all applicants must be graduates of a medical school of recognized standing, and must also meet other requirements which include experience and training in the field of medicine. The age limits are 45 years for Panama Canal Zone positions and 62 years for other positions. These age limits are waived for persons entitled to veteran preference (up to the age of 62 for the Panama Canal Service and without limitation for other agencies).

Applications must be received in the Commission's Washington Office not later than April 22, 1947. Information and application forms may be obtained at most first- and second-class post offices, from Civil Service regional offices, or from the U. S. Civil Service Commission, Washington 25, D. C.

## INSTITUTE OF LIFE INSURANCE

More than a half-million dollars for research in heart disease will go out to U.S. and Canadian colleges, hospitals and students from the Life Insurance Medical Research Fund in 1947, it was announced recently by M. Albert Linton, chairman of the Fund. The 1947 allocations raise the total of all funds granted by the organization since 1945 to well over the million dollar mark.

Supported by 148 legal reserve life insurance companies in the United States and Canada, representing 93 per cent of the life insurance in force in the U. S., the Medical Research Fund is administered through a board of directors composed of leading life insurance executives and an advisory council of medical research experts. Scientific director of the Fund is Dr. Francis R. Dieuaide, clinical professor of medicine on the staff of the College of Physicians and Surgeons of Columbia University.

## UNITED NATIONS RELIEF AND REHABILITATION ADMINISTRATION

"UNRRA food has averted three major famines in Europe—Greece, Yugoslavia and Austria," Dr. Arnold P. Meiklejohn, Senior Consultant in Nutrition in the UNRRA European Regional Office, has reported to Major General Lowell W. Rooks, Director General of UNRRA. "Avoidance of these famines has helped keep Europe free of epidemic diseases of the kind that raged after World War I," he declared.

"Although UNRRA has been able to prevent the disaster of major famine in Europe, its resources have not been sufficient to remedy an important incidence of underfeeding," Dr. Meiklejohn explained. "This underfeeding is resulting in debilitated and demoralized populations. Now with UNRRA food shipments drawing to a close, their food needs are intensified and they face the primary health problem of obtaining sufficient calories."

## VETERANS ADMINISTRATION

Veterans Administration recently reported a total of 458,749 admissions of veteran-patients to VA and non-VA hospitals during the calendar year 1946, an increase of 174,342 or 61.3 per cent over calendar year 1945. During the same period, beds available for the treatment of veterans in VA hospitals increased 23 per cent, from 79,450 to 97,772 and the number of hospitals increased aproximately 26 per cent, from 97 to 122.

The greatest number of admissions—381,619 or 83.19 per cent of the total—were general medical and surgical patients. Next were neuropsychiatric patients, amounting to 11.77 per cent of the total, or 53,981 admissions. Smallest group was tuberculosis patients, who numbered 19,609 or 4.27 per cent of the total.

* * * *

Veterans Administration has established seven paraplegic centers in hospitals strategically located from coast to coast. These centers, especially designed to treat veterans with spinal cord injuries which result in partial or complete paralysis of the body, are in operation in VA hospitals at Framingham, Mass.; Memphis Tenn.; Van Nuys, Calif.; Staten Island, N. Y.; Richmond, Va.; Bronx, N. Y.; Hines, Chicago, Ill.

VA has approximately 1,200 veteran-patients suffering from injuries to the spinal cord. This number is expected to reach about 2,000 eventually.

### McDonnell Named Schering Vice President

Mr. Francis C. Brown, president of Schering Corporation, Bloomfield, N. J., has announced the appointment of Dr. John N. McDonnell as vice president of the Company. Dr. McDonnell formerly held the post of director of domestic sales and promotion. Mr. Herman W. Leitzow, asistant director in charge of domestic sales for Schering, has been designated domestic sales manager.

Schering Corporation produces endocrine, x-ray diagnostic, chemotherapeutic and pharmaceutical products for the medical profession. Its research laboratories and plants are located at Bloomfield and Union, N. J. Schering Corporation is the world's largest manufacturer of hormones.

### New Device Aids Doctors Inject Penicillin Formula

A new device that aids physicians to inject penicillin in the beeswax and oil suspension which is considered a great advance in syphilis therapy was announced recently by Dr. Theodore G. Klumpp, president, Winthrop Chemical Company, Inc.

Called a Punctule, it was developed by Martin Lasersohn, M.D., a Winthrop vice president. It is made of glass and neoprene. and the unit includes a double-end 21-gauge needle. To administer the injectible medicament, the Punctule is placed into the barrel of an ordinary hypodermic syringe, and injection is accomplished by pushing the thumb-rest of the Punctule. As now being offered by Winthrop, the Punctule will contain a dosage of 300.000 units of penicillin in beeswax and oil called the Romansky formula.

# NORTH CAROLINA MEDICAL JOURNAL

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## ISAAC HALL MANNING, M. D.

Isaac Hall Manning was born in Pittsboro and was raised in Chatham County. His father was John Manning, the first professor of law at the University of North Carolina. Isaac Manning entered the University of North Carolina in the fall of 1883 and graduated in 1887.

The medical school was very young when Dr. Manning joined its faculty in 1901 as professor of physiology. He had had no special training for this position, but immediately set about preparing himself by working in the physiology laboratories at Chicago and Harvard. This lack of training was the first of many obstacles he surmounted during his long career at the University.

In 1905, when Dr. Whitehead went to the University of Virginia, Dr. Manning was selected as dean of the struggling school. He undertook this added responsibility with great trepidation, but with his usual courage and determination set about improving the staff, the curriculum, and especially the standards of work in the school and the requirements for admission. The fact that none of these students who completed the first two years of medicine in the school failed to transfer is ample proof of the excellent job he did, as is the number of outstanding doctors—his former students—practicing medicine throughout this state. During these years the school's reputation as one of the best two-year medical schools in the country became firmly established among the leading four-year schools of the nation.

The present North Carolina medical care program cannot claim direct origin from Isaac Manning, but it is unquestionably a logical development of his philosophy and of his efforts to improve medical care and medical education.

It can probably be said that North Carolina has produced no clearer medical thinker than Isaac Manning. He had already had a full life when he resigned the deanship in 1933, but he continued to teach physiology until he was retired as Kenan Professor Emeritus.

He was elected president of the State Medical Society in the year 1932. He went at this job just as he had gone at every other job he had ever undertaken. He was tremendously interested in hospitalization, and it was largely through his efforts that the Hospital Saving Association in Chapel Hill, a Blue Cross plan, had its beginning. What he did as chairman and medical director of this organization is a matter of record. Before getting too far into this new work, he spent two months in England and France studying hospitalization. His approach to this problem is reminiscent of the days when he was preparing himself to teach physiology, but it was a young man of 67 who went abroad. One says a "young" man because his brain was just as fertile, his source of original thought was just as active as it was in those early days. Yes, when the record is written, it will be found that Isaac Manning in those closing days of his long and fruitful life did a job that can be put on the pedestal with the other great jobs he had done. However, he was not granted the privilege of carrying his plan for voluntary prepaid hospital and medical care insurance as far as he had hoped. He was stricken with a heart attack in December, 1945, and on February 12, 1946, died at the age of 79.

In so short a space it is impossible to mention all the great things that Isaac Manning accomplished during his long life. He also had his disappointments, but he never gave up, and no man alive or dead has ever seen his shield reversed. The present great medical building that stands at Chapel Hill, while not built under Dr. Manning's regime, represents part of the architectural plans of a building for which he had worked for many years.

But enough of tangible things. No story of Isaac Manning would be complete which fails to tell something about the humanness of the man. He thought of medicine in terms of people. He was a courteous, kindly, and gentle person. He liked his "boys," and every medical student he ever taught received that classification. In spite of all his administrative problems and difficulties, he always had time to advise and counsel his students in his office or at his home.

At times he expressed fear that doctors' professional charges were too high and standards of performance not high enough. He did not feel that any man should get rich from the practice of medicine; he thought of medicine in terms of the humanities. He felt that medical practice was something close to the spiritual, and should be free to those who were not able to pay. That is why he favored a plan that would make medical care available to every man, woman and child of this great state of ours through prepaid insurance.

Isaac Manning is dead, but for those of us who knew and loved him, his influence and his spirit continue to live. Many of the things he worked for still hover beyond the horizon. To us he has thrown the torch, and by God's grace we will make these things come true!

W. Raney Stanford, M.D.
Chief of Medical Service, Watts
Hospital, Durham, North Carolina;
University of North Carolina
Medical School, 1917.

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Isaac Hall Manning, son of John and Louisa Hall Manning, was born in Pittsboro, North Carolina, on September 14, 1866, and died in Chapel Hill on February 12, 1946. His family moved to Chapel Hill in 1881, and his father taught in the University's Law School until 1889. After academic study at the University of North Carolina from 1882 to 1886, he served as chemist for the Navasso Guano Company at Wilmington, North Carolina, until 1893, when he entered the medical class at Long Island College, receiving the degree of Doctor of Medicine in 1897. He did graduate work at Harvard and at the University of Chicago, and for a brief period was surgeon for the Atlantic Coast Line Railroad. In 1901 he returned to the University of North Carolina as professor of physiology, a position he held until his retirement as Kenan Emeritus Professor in 1939.

He was married in 1906 to Martha Battle Lewis, who died the following year. In 1911 he married Mary Best Jones, who, with three sons, survives him.

From 1905 to 1933 he was dean of the Medical School. It was during this period and largely through his energy, industry, and sound judgment that this school rose from a position of relative insignificance to one of high esteem in the field of medical education. His personal and intellectual integrity, his high standards of scholarship, his frankness and eminent fairness in all matters brought to him the respect, confidence, and affection of his students and his colleagues, and also brought to this medical school the trust and admiration of the deans and faculties of the other schools to which its students were transferred for their third and fourth years. If one were to make a criticism of his deanship, it would be that his unselfish generosity often led him to starve his own department in order to distribute the school's meager funds more liberally among the other departments. As teacher, administrator, and man he left an ineffaceable stamp upon this state.

Dr. Manning's influence extended far beyond Chapel Hill and the University of North Carolina. The medical profession of the state showed a small measure of its appreciation of his value by making him president of the Medical Society of the State of North Carolina in 1933. In that capacity he did fine service in the interest both of organized medicine and of the general public. It was from his idea and chiefly through his ardent efforts that the Hospital Saving Association was organized. Until his death he continued active direction of this work. This plan of medical and hospital insurance has spread widely throughout the nation and is playing an important part in solving the professional and social needs in matters of medical care.

Isaac Hall Manning, M.D.

September 14, 1866 February 12, 1946

University of North Carolina School of Medicine
Professor of Physiology 1901 - 1939
Dean of School 1905 - 1933

In Dr. Manning's retirement the University lost one of its most useful members; in his death the state lost one of its most useful citizens, and those of us who knew him have lost one of our best friends.

James B. Bullitt, M.D.
Professor of pathology,
University of North Carolina
Medical School.

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A simple approach to things was one of Dr. Isaac Hall Manning's characteristics. The superfluous did not appear to bother him. He proceeded directly to the essentials. This ability to reduce things to simple terms has always been one of the attributes of greatness in character, in intelligence, and in science. Dr. Manning possessed the attribute in all three fields.

His character was founded upon the rock of honesty. His intelligence analyzed the medical care problem in North Carolina and combined the component interests of public, hospitals, and physicians into the Hospital Saving Association.

George L. Carrington, M.D.
Burlington.

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# THE ATOMIC BOMB EXPERIMENTS IN THE PACIFIC

## *With a Consideration of the Relationship of Atomic Energy to the Future of Medicine*

Eugene P. Pendergrass, M.D.*
Philadelphia

Last summer in the tiny Marshall Island atoll of Bikini two tests were made, Test Able being the detonation of an atomic bomb above the water on July 1 and Test Baker the explosion of another atomic bomb under the water of the lagoon on July 25.

### *Purpose of Experiments*

The purpose of the tests was simple and logical. The atomic bomb is a device utilizing the phenomena of nuclear fission to produce an explosion. The explosion is unparalleled in its magnitude. A great deal of our knowledge concerning the bomb's power and characteristics has been assembled as a result of studies following the explosions at New Mexico, Hiroshima, and Nagasaki, but there is a considerable amount of further information to be obtained. It was with this idea of obtaining more information—some military and some scientific—that the "Operation Crossroads" was planned.

Operation Crossroads was a tremendous enterprise. The job of assembling, operating, and supplying the ships and men involved in the test was in itself an undertaking which compared in size and complexity with a major wartime operation(1). Approximately 42,000 men and 250 ships participated in the operation(1). In addition, it was necessary to plan for the gathering and recording of the results of the tests, in order that those observations might be evaluated.

Colonel Stafford Warren of the Manhattan Engineer District was in charge of the protection of personnel from radiologic hazards. Under his direction there were a number of physicists, chemists, engineers, instrument men, and some civilian personnel. Colonel Warren's influence was felt everywhere. There was scarcely a single operation in which he was not directly concerned, because the safety of the personnel was paramount.

The target ships included some of our proud fighting ships with valiant war records. Included in the target array were destroyers, submarines, attack transports, landing ship tanks, landing craft infantry, LCT's, LCM's, floating dry docks, barges, cruisers, aircraft carriers, and battleships. These target vessels were strategically concentrated in the lagoon in the immediate vicinity of the "bull's eye" in order to test the effect of the bomb on the various types of vessels. The detailed knowledge of the destructive power of the bomb should provide the Navy with information concerning any necessary change in ship designs, in tactical formations at sea, and in the manner of anchoring ships in port. Other information was obtained concerning the effect of the atomic bomb against aircraft, both airborne and grounded, and its effect on a wide variety of weapons and equipment.

An important consideration in the test was the effect of the irradiation on living beings. It was necessary to obtain this information in order to know how to provide for the protection and treatment of personnel who may in the future be exposed to atomic bomb radiations, either in war or in peace.

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* Professor of radiology, University of Pennsylvania School of Medicine; University of North Carolina Medical School, 1916.

1. "At the Crossroads:" All Hands, pages 2-10, July 1, 1946.

It is recalled that in the New Mexico explosion of the atom bomb, temperatures of fantastic proportions crumpled a steel tower. On the basis of that experiment it was predicted that the terrific blast of heat would undoubtedly cause considerable damage in the immediate vicinity of the detonation. Those of you who have seen movies of the Able test are familiar with the damage that was created as a result of direct heat radiation, and the secondary damage due to explosions of ammunition, gasoline, and other inflammables.

In the two Japanese explosions direct heat radiation was responsible for many casualties. The much publicized radioactive aftereffects also caused many deaths and injuries. From the Bikini test, knowledge was obtained concerning the relationship between the distance from the blast and the degree of injury, and also concerning the efficacy of protection offered by steel plates. Information was also obtained on the possibility that radioactive material might enter protected spaces through ventilation ducts.

Many of you will recall the predictions concerning water disturbances which would be caused by the under-water detonation of the bomb. These predictions varied from conservative 70-foot waves in the immediate vicinity of the explosion, to horrifying visions of bomb-born tidal waves, engulfing cities on distant shorelines. It was foreseen that ships near the explosion center would be subjected to terrific stresses, but it was not until after the Bikini test blast that the real information was obtained.

### *Description of Operation Crossroads*

The island of Bikini was transformed into a robot laboratory, in which automatic cameras and devices of various types recorded scientific data concerned with the explosion. The work on Bikini Island was performed by the Fifty-Third Seabee Battalion, veterans of Guadalcanal, Vella Lavella, Bougainville, and Guam(1).

### *Able test*

The lagoon, which is about ten miles wide and twenty miles long, is about the size of San Francisco Bay. It was divided into sectors, and the target ships were placed within these sectors. On the day before the Able test the ships of the fleet, except for the target vessels, left the lagoon and took up prescribed stations. These stations were approximately twenty miles away from the target area. Even at that distance we were warned it was not safe to look at the flash of the exploding bomb. On Able day the weather was perfect. There was good visibility and a constant air movement. Therefore, the test proceeded according to plans. Aircraft of the task force were the first to enter the lagoon after the blast, because it was expected that the air would become free of radioactive particles more rapidly than the water. In a relatively short time, the fleet was ordered to approach the lagoon, carefully testing the water as it advanced. After it had been found safe to re-enter the lagoon, the various patrols began to monitor the sectors assigned to them, and in due time the extent of the radioactivity was outlined.

The amount of information obtained from the tests depended to a considerable extent upon the rapidity with which the monitoring of the lagoon and the target ships could be accomplished, because it was only after such information was obtained that the salvage teams were able to swing into action to control secondary fires and internal explosions. Likewise, it was essential that boarding parties return to the ships as soon as it was safe, in order to collect the animals from the ships, remove the scientific instruments, and observe the effect of the bomb on the ships and their equipment. This was a tremendous undertaking, and one of the most important of the entire operation. Three weeks were allotted to the collection of these data.

### *Baker test*

The same general plan was carried out for the Baker test, except that this time it was unnecessary for the fleet to be so far away, and it was possible to look at the blast without injury to the eyes. Following the detonation of the bomb the fleet entered the lagoon more slowly than after the first test. The Baker test was a much more serious undertaking than I had conceived it to be. The radioactivity was more intense, and it was necessary to exert a greater degree of vigilance in order to protect the personnel of the fleet.

The operation is still being carried on, and there is a tremendous amount of work yet to be done. Some of the ships are still radioactive and probably will be for some time to come.

The first two tests at the Crossroads, to my mind, represented the greatest pageant of all times. The fantastic nature of the physical forces brought into play, the mighty effects of radiation, and the tremendous array of ships and men concerned with this test were most impressive.

### *Effects on Experimental Animals*(2)

#### *Able test*

A total of about 3500 animals—goats, pigs, guinea pigs, mice from the National Cancer Institute, and albino rats—were dispersed upon twenty-two ships of the target fleet and exposed to the effects of the "Able" bomb. They were tethered, caged, or confined at locations above and below decks.

Ten per cent—about 350—died almost instantly of air blast or heat or both. Fifteen per cent—something over 500—died within a few days from radiation poisoning. Another 350, about half of which would surely have died in any case, were killed for purposes of study. In other words, just about one third of the animals, scattered over an area at least two miles in radius, were the direct victims of the bomb's major effects; yet the Able test, you will recall, was the test which generally was conceded to be the least destructive of the three planned.

Since, in the case of an air burst, the area of lethal radioactivity substantially exceeds the radius of air blast and heat, all of the animals which died may be counted actual or probable victims of radiation effects.

There are two groups of animals surviving the "Able" bomb which are of interest.

The first was a group of 15 goats selected for intensive treatment of radiation sickness. These goats were retrieved from ships on which all others of their breed were dead, each surviving goat from a different ship. One of them was destroyed because of extensive flash burns of the face. Of the remaining 14 goats, 8 died within a period of nine to fifteen days, 1 on the forty-third day, and 1 on the seventy-ninth day. Only four were alive in November, 1946.

As soon as the goats could be received aboard the animal ship and blood counts made, each received a transfusion of whole blood amounting to 15 per cent of the blood volume. Each of the surviving goats received a daily transfusion of whole blood averaging between 7,000 and 8,000 cc. Each was injected with a total of 37,500,000 units of penicillin. The total amount of whole blood which each received amounted to something over 150 gallons.

Ten of the dead goats received a daily average of from 300 to 7200 cc. of whole blood; the total amount of penicillin which each received varied from 1,000,000 to 36,000,000 units.

The four surviving goats are both anemic and leukopenic. Blood analyses made about two weeks after treatment was begun revealed the presence of a few very immature blood cells, but in November there was no acceptable evidence of any regeneration of the blood elements.

The second group comprises about 100 white rats. Every rat in this group is in a leukemoid state. Premature deaths have been occurring regularly in this group, all of which were exposed to intense total radiation. The normal average white cell count of rats in the Crossroads colony was 10,200. This particular group of 100 have—and have had since recapture—white cell counts between 20,000 and 30,000, with an occasional one up to 50,000. It is not known yet whether these rats are in a leukemoid state or whether they have developed a true leukemia.

It has not yet been possible to make any conclusive genetic studies, although both the mice—which were deliberately placed in positions where they would receive sublethal dosages—and some of the rats have produced litters.

Despite the tremendous amount of laboratory and clinical data already on hand, none of the animal studies have reached the stage of final and binding conclusions. The monumental data sheets, taken from remotely controlled instruments, which exactly registered the heat, blast, and radiation intensity at each animal station, remain to be organized and correlated with the respective test subjects. Literally hundreds of prepared specimens must be subjected to pathologic study.

#### *Baker test*

In the second or "Baker" test, 199 albino rats—all progeny more or less remote of the original hardy Wistar strain—and 20 pigs were placed at various sheltered positions aboard ships of the target fleet. The pigs were confined in the sick bays of five target ships, presumably ranging in category from the battleship downward through the carrier

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2. McCullough, John: Address at Union League in Philadelphia, October 18, 1946.

and cruiser to the destroyer and relatively thin-hulled attack transport. Not one of the pigs was recovered alive. All were killed by radiation. Some were reached immediately, but the last after a lapse of five days. Of the 199 white rats, 129 were recovered alive. It is important to point out that neither heat nor blast had any important effect upon the animals in this test, which were shielded by hulls, upper works, and bulkheads.

Seventy-one of the 199 white rats were dead of radiation when reached by recapture crews. Ten of the surviving group — of which ten, at least one-half would have died —were killed for study. Of the remaining 118, 61 were alive in October, and deaths were occurring regularly.

### *Contamination of the Environment by Fission Products*

In the first test, only about .005 per cent of the fission elements—the actual disintegration elements of the bomb—was absorbed by the water of the lagoon. Such radiation as was absorbed by the target fleet—and hence by the animals placed on the ships—resulted from instantaneous radiation, measurable in a few millionths of a second.

Quite a different situation existed on July 25. There, about 50 per cent of the fission products were trapped by the water and carried aloft. The major portion of the radioactivity returned to the lagoon to contaminate not only the ships but the water of the lagoon over an area of approximately twenty square miles.

### *Pathologic Effects of Atomic Blast on Human Beings*

Captain Shields Warren has recently reported on the pathologic effects of an instantaneous dose of radiation, as a result of his studies at Hiroshima and Nagasaki(3). He paints a vivid picture of what can be expected from atomic bomb explosions similar to those observed at Bikini. The pathologic effects were divided into two groups: (1) those produced by heat—primary thermal injury of the flash burn type, and secondary thermal injury due to induced fires; and (2) those produced by radiation. At the time of Captain Warren's study, 80,000 people had died in Hiroshima and 45,000 at Nagasaki.

The characteristic clinical course produced by radiation injury resulting from the atomic bomb explosions may be divided into two stages: The *immediate* effects were weakness, malaise, fever, and often death within forty-eight hours; the *delayed* effects manifested themselves in a variety of ways.

The effect on the blood could be readily followed by the clinical manifestations as well as by the laboratory observations. The patients were divided into three groups. The *first* group were those with marked leukopenia, in which infection, particularly Ludwig's angina, was the outstanding manifestation. A great many of these died in the first three weeks after the bombing. In the second group, which lived from three to five weeks, death was associated with thrombocytopenia and marked depletion of the bone marrow. The skin lesions varied from extensive ecchymoses to purpuric patches and small petechiae. Mucosal hemorrhages occurred everywhere. In the *third* group, there was serious bone marrow damage with anemia. At times the marrow was so depleted that little but reticulo-endothelial cells appeared in the blood.

The effect on the gonads was much more prominent in males than in females. Atrophy of the germinal epithelium of the testis was marked. Suppression of menstruation occurred in some of the high school girls. A recent survey by Colonel James Cooney of the Walter Reed Hospital showed that sterility has become more of a problem than was anticipated. Many flesh burns are still unhealed, and keloid formation is tremendous. A large number of persons still have bone marrow deficiencies. Observations will have to be carried on for many years to learn the total effect of instantaneous exposure such as occurs following detonation of bombs similar to those used in Nagasaki and Bikini.

### *Medical Uses of Atomic Energy*

The discussion thus far has been on the use of atomic energy as an instrument of war. What are some of the prospective medical uses of atomic energy?

Plans are now under way by the Manhattan Engineer District to release a great many radioactive isotopes for medical investigation and treatment. The immediate application of such isotopes to medical problems makes it appear relatively certain that advances in therapeutics, in medical science, in biology, and in chemistry are the greatest peace-time reward which will be associated

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3. Warren, S.: The Pathologic Effects of an Instantaneous Dose of Radiation, Cancer Research 6:449-453 (Sept.) 1946.

directly with the next ten years of the "atomic age."

It is stated that the chain-reacting uranium piles, such as those located at Hanford, are sources of neutrons and other radiations equivalent to more than a million cyclotrons(4). These neutrons, which were used to produce new elements such as plutonium, may also be used to produce in quantity long-lived radioactive carbon and hydrogen(4). These elements will make it possible for the medical research worker to label with radioactivity those organic compounds that play essential roles in the animal and human body, both in health and disease. Almost every organic chemical entity of possible concern in biology or medicine contains one or both of these elements in key structural positions(4). Thus, by the proper chemical or, if necessary, biologic synthesis, it will be possible to tag most organic compounds of medical or biologic interest with radioactive labels.

For some years radioactive phosphorus, iron, sodium, iodine, strontium sulfur, and potassium have been among the materials used in medical investigations and treatment. Most of us are familiar with the use of radioactive phosphorus in the treatment of leukemia and polycythemia. Strontium has been used experimentally in the treatment of bone tumors. Iodine has been employed in the investigation of thyroid metabolism, and in the treatment of hyperthyroidism and carcinoma of the thyroid. According to Bale(4), none of these radioactive isotopes are comparable in their usefulness to radioactive carbon or hydrogen in the fields of medical research, since each of the former, if present at all, is usually loosely attached to the key structural group of organic compounds.

Radioactive carbon will have important applications in cancer research, in pharmacology, in biology, in medical therapeutics, and in medicine in general. The study of the metabolism of malignant tumors is one of our foremost problems. Considerable basic research still remains to be done also on aging and the degenerative diseases. Bale, in discussing this general subject, states that we still need to know many fundamental things—for instance, what part of the cell is formed permanently during its early development, and what portion is renewed from metabolites supplied by the bloodstream. We need to know what factors are important in cell and tissue degeneration, and whether we can influence the speed and magnitude of such degeneration in any way. How do the different types of tissue cells in an aging animal differ in their metabolism from cells of the immature and young adult animal?

Comprehensive metabolic studies using the tracer technique should provide a basic foundation of knowledge from which it may be possible to obtain an insight leading to an increasing human adult span of productivity and pleasant existence. Radioactive isotopes are the new tools that are of such fundamental importance, and they will soon see nation-wide and world-wide use.

### *The Importance of the Atomic Bomb as a Military Weapon*

In the World Report for September 17 there is a special editorial on the "atomic bomb" as a military weapon. Some of the points brought out in this editorial are as follows:

> The one basic and all-important fact concerning the atomic bomb is that it transcends all previous efforts of mankind in the long history of warfare.
>
> The bomb already has altered and will continue to affect the political and military pattern of the world. The question of control of the bomb is now the subject of negotiation and debate.
>
> The atomic bomb has increased vastly the possibility of devastating attack without declaration of war and of pre-war sabotage on a catastrophic scale.
>
> The destructive capacity of the bomb on land is well known as a result of the explosions over Hiroshima and Nagasaki. Exploded in the air at a selected height, it will destroy all normal land structures and most life within a radius of a mile and a half. There will be an additional area of less damage and an extensive delayed effect largely fatal to life, due to radioactivity.
>
> The first Bikini test determined the effect of an air explosion over a closely concentrated group of vessels at anchor. The results indicated that such a bomb would damage fatally even large war ships within an area of half a mile, and inflict damage to exposed structures on a diminishing scale up to a mile. Exposed personnel in this area would be killed or incapacitated.
>
> The second Bikini test determined the effect of a shallow submerged bomb under a closely concentrated group of vessels at anchor. This underwater explosion indicated that such a bomb would sink or seriously damage even large naval vessels at a distance of 500 yards and damage to less degree other vessels up to 1000 yards. It resulted in extensive and persistent radioactive effects on water and ships.
>
> The atomic bomb as a military weapon will have far-reaching effects on the technique of warfare. It will increase the totality, the complexity, the horror, and the cost of war. It will establish science as an additional defense force of every great nation.

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4. Bale, W. F.: Some Prospective Medical Uses of Atomic Energy, J. Am. Pharm. A. (Pract. Pharm. Ed.) 7:81-82 (Feb.) 1946.

### *Control of Atomic Power*

Mr. Bernard M. Baruch has presented the American proposal for international control to the members of the United Nations Atomic Commission. His report met with acclaim from most of the nations except Russia and her satellites. Mr. Andrei Gromyko has presented the Russian proposal for international control. Both of these reports should be studied by all of us.

The problem of how to avert atomic disaster is still very new. Only tentative solutions can be brought forth at this time. One thing is certain, we cannot expect to hold up the peace-time uses of atomic energy, even for security reasons. Fortunately we do have the embryonic organization, the United Nations Council. It is possible for it to grow. There is no other way known at present which can establish effective safeguards against war and mass destruction.

The United States has a great opportunity to assume an aggressive leadership in the formation of a world order of universal law, because of its preeminence in military power.

What can you and I do to assist in the movement of peace? This problem is ours. As you know, atomic energy and atomic bombs are marked "made in the United States." Soon they will be made elsewhere.

We can make it our business to keep informed about atomic energy, and in turn keep our representatives conscious of their obligations to strive for everlasting peace. We can join the movement of the atomic scientists. We can make contributions to help defray the expenses of the propaganda these scientists are fostering. The United States, through the United Nations, must become as aggressive in peace as she was in war. Before the world, we must be united in our aims. Even then the progress will be slow and it may be necessary for us to sacrifice more for peace than for war. Above all, we must not become discouraged.

If we can develop a plan for peace which will succeed, *all nations can have atomic energy and much more.*

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**Rehabilitation in tuberculosis** should begin no later than the day the patient enters the sanatorium, because from the beginning he must know that there is still a future for him. This knowledge acquired early in illness makes a great difference in his morale and his manner of adjustment to a changed way of life.—Herman E. Hilleboe, M.D. and Norvin C. Kiefer, M.D., Pub. Health Rep., Mar. 1, 1946.

## EXPERIENCES WITH STREPTOMYCIN THERAPY

### *Review of Clinical and Laboratory Studies at the Boston City Hospital*

H. William Harris, M. D.*

*and*

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Boston

During the past ten years great strides have been made in the treatment of specific bacterial diseases. Since the introduction and widespread clinical use of the sulfonamide drugs and penicillin, the recovery rates in cases of streptococcal, staphylococcal, pneumococcal, and Neisserian infections have been much improved. Penicillin, however, has little or no value in most of the diseases caused by gram-negative bacilli, and although the sulfonamides are effective to some degree against certain of these infections, more effective agents were obviously to be desired. As a result of the diligent search for such agents, various new antibiotics were discovered; these were shown to inhibit enteric organisms and other gram-negative bacilli, but most of them were too toxic for clinical use(1a).

In 1944, Schatz, Bugie and Waksman(1b) reported the isolation of an antibiotic substance from cultures of Actinomyces griseus. This agent, which they termed streptomycin, was found to be highly effective against various gram-negative and acid-fast bacilli, less active against gram-positive micro-organisms, and relatively inactive against the clostridial group(1).

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* University of North Carolina Medical School, 1942.

1. (a) Waksman, S. A., and Schatz, A.: Streptomycin—Origin, Nature and Properties, J. Am. Pharm. A. (Scient. Ed.) 34:273-291 (Nov.) 1945. (b) Schatz, A., Bugie, E., and Waksman, S. A.: Streptomycin, a Substance Exhibiting Antibiotic Activity against Gram-Positive and Gram-Negative Bacteria, Proc. Soc. Exper. Biol. & Med. 55:66-69 (Jan.) 1944. (c) Helmholz, H. F.: The Effect of Streptomycin on Bacteria Commonly Found in Urinary Infections, Proc. Staff Meet., Mayo Clin. 20:357-362 (Oct. 3) 1945. (d) Buggs, C. W., Bronstein, B., Hirshfeld, J. W., and Piling, M. A.: The *in Vitro* Action of Streptomycin on Bacteria, J.A.M.A. 130:64-67 (Jan. 12) 1946. (e) Robinson, H. J., Smith, D. G., and Graessle, O. E.: Chemotherapeutic Properties of Streptomycin, Proc. Soc. Exper. Biol. & Med. 57:226-231 (Nov.) 1944. (f) Schatz, A., and Waksman, S. A.: Effect of Streptomycin and Other Antibiotic Substances upon Mycobacterium tuberculosis and Related Organisms, Proc. Soc. Exper. Biol. & Med. 57:244-248 (Nov.) 1944. (g) Feldman, W. H., Hinshaw, H. C., and Mann, F. C.: Streptomycin in Experimental Tuberculosis, Am. Rev. Tuberc. 52:269-298 (Oct.) 1945.

In this paper we wish to review the results of clinical and laboratory experiences in the treatment of various infections with streptomycin at the Boston City Hospital(2). Most of the findings reviewed here are presented in detail elsewhere(3).

### *Absorption and Excretion*

Streptomycin is poorly absorbed from the gastrointestinal tract, but it is not destroyed by gastric juice or intestinal enzymes, and high concentrations can be recovered from the feces when a dose is given by mouth. High blood concentrations are rapidly obtained following a parenteral dose, and detectable amounts remain in the blood for six to eight hours, depending upon the amount injected(4). The drug is excreted chiefly in the urine, where 50 to 70 per cent of the total parenteral dose can be recovered following a single dose(4a,d). Streptomycin can also be recovered from the peritoneal and pleural fluids after parenteral administration, but the absorption into these cavities is delayed and the levels in these fluids are considerably lower than those in the blood. Little or none of the drug crosses the normal meninges into the cerebrospinal fluid, although low concentrations, usually therapeutically inadequate, may be found in the spinal fluid after administration of the drug to patients with meningitis(4d,5).

### *Dosage and Administration*

Streptomycin is standardized by its antibacterial activity. The S unit, as defined by Waksman(1a) is the minimum amount of material which, when present in 1 millimeter of nutrient media, will just inhibit the growth of a given strain of Escherichia coli. One S unit, however, is essentially equal to 1 microgram of pure streptomycin base, and 1 Gm. is, therefore, equivalent to 1,000,000 units. The doses of the drug given therapeutically, being large, are usually referred to by weight, whereas the levels of the drug in the body fluids and the inhibiting concentrations for bacterial strains, being small, are usually recorded in units or micrograms. In the cases to be presented, streptomycin was administered by intramuscular, intravenous and intrathecal injection, by topical application, and by nebulization. The parenteral dose ranged from 1 to 6 Gm. daily.

### *Streptomycin Levels and Bacterial Sensitivities*

There are various methods by which the streptomycin concentrations in body fluids may be determined(6). In this laboratory, two-fold dilutions of the body fluid are made in broth, and these are inoculated with 50,000 to 100,000 type A Friedlander's bacilli. The strain used is regularly inhibited by 0.78 units but not by 0.39 units of streptomycin per milliliter. The streptomycin sensitivity of a particular bacterial strain is determined by the addition of a 1:100,000 dilution (containing 50,000 to 100,000 organisms) of the pure culture in broth, to serial broth dilutions of streptomycin. The sensitivity is taken as the minimum concentration in which, after twenty-four hours' incubation, there is neither visible growth nor growth on subculture to streptomycin-free agar.

Numerous reports indicate that different bacteria and different strains of any given bacterial species vary considerably in their sensitivity to streptomycin(1c,7a,b). Of even greater clinical importance, however, is the tendency for a sensitive bacterial strain to

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2. The studies were carried out with the collaboration of Drs. Roderick Murray, Tom F. Paine and Lawrence Kilham, and Dr. Manson Meads participated in some of them. Miss Clare Wilcox assisted in the various laboratory studies.

The streptomycin was provided by the National Research Council from suppiles assigned for clinical investigations recommended by the Committee on Chemotherapeutics and Other Agents. The latter part of these studies was aided by a grant from the United States Public Health Service.

3. (a) Finland, M., et al.: Development of Streptomycin Resistance During Treatment, J.A.M.A. 132:16-21 (Sept. 7) 1946. (b) Harris, H. W., et al.: Streptomycin Treatment of Urinary Tract Infections, with Special Reference to the Use of Alkali, Am. J. Med. 2:229-250, 1947. (c) Paine, T. F., Murray, R., Harris, H. W., and Finland, M.: Streptomycin in the Treatment of Certain Gram-Negative Bacillus Infections of the Central Nervous System, Am. J. M. Sc., in press. (d) Harris, H. W., Murray, R. Paine, T. F., and Finland, M.: Streptomycin Treatment of Pulmonary Infections; Clinical and Bacteriological Studies of 6 Cases, New England J. Med. 236:611-622 (April 24) 1947; (e) Harris, H. W., and Finland, M.: Local Streptomycin Therapy of Ear Infections: Clinical and Bacteriological Observations, to be published.

4. (a) Buggs, C. W., Pilling, M. A., Bronstein, B., and Hirshfeld, J. W.: The Absorption, Distribution and Excretion of Streptomycin in Man, J. Clin. Investigation 25:94-102 (Jan.) 1946. (b) Zintel, H. A., et al.: Studies on Streptomycin in Man. I. Absorption, Distribution, Excretion and Toxicity, Am. J. M. Sc. 210:421-430 (Oct.) 1945. (c) Anderson, D. G., and Jewell, M.: The Absorption, Excretion and Toxicity of Streptomycin in Man, New England J. Med. 233:485-491 (Oct. 25) 1945. (d) Rutstein, D. D., Stebbins, R. B., Cathcart, R. T., and Harvey, R. M.: The Absorption and Excretion of Streptomycin in Human Chronic Typhoid Carriers, J. Clin. Investigation, 24:898-909 (Nov.) 1945.

5. Elias, W. F., and Durso, J.: Blood, Urine and Fecal Levels of Streptomycin in the Treatment of Human Infections of E. typhosa, Science 101:589-591 (June 8) 1945.

6. (a) Waksman, S. A., Bugie, E., and Schatz, A.: Isolation of Antibiotic Substances from Soil Micro-Organisms, with Special Reference to Streptothricin and Streptomycin, Proc. Staff Meet., Mayo Clin. 19:537-548 (Nov. 15) 1944. (b) Heilman, D. H.: A Method or Estimating the Concentration of Streptomycin in Body Fluids, Proc. Staff Meet., Mayo Clin. 20:145-150 (May 16) 1945. (c) Stebbins, R. B., and Robinson, H. J.: A Method for Determination of Streptomycin in Body Fluids, Proc. Soc. Exper. Biol. & Med. 59:255-257 (June) 1945. (d) Forgacs, J., Kornegay, G. B., and Henley, T. F.: Studies on Streptomycin. I. Assay in Body Fluids, J. Lab. & Clin. Med. 31:514-522 (May) 1946.

acquire a high degree of resistance to streptomycin when it is exposed to sublethal concentrations of the antibiotic. This phenomenon may easily be demonstrated *in vitro*, and also occurs in patients during treatment(3a,7).

### *Clinical Results*

Streptomycin has been used at the Boston City Hospital for a variety of diseases. The clinical and bacteriologic results in a small but thoroughly studied group of patients with infections of the urinary tract, central nervous system, bronchopulmonary tract, and ears are included in this review.

#### *Urinary tract infections*

Studies were made in 21 adult patients with urinary tract infections who were treated with streptomycin. Most of them had chronic pyelonephritis and cystitis, and all had received sulfonamides, penicillin, methenamine, or mandelic acid without improvement in symptoms, pyuria, or bacilluria. Anatomic abnormalities were demonstrated in 10 instances, but retrograde pyelograms were done in only 11 of these patients. Diminished renal function was found in 7 patients; in 3 of them, it was probably the result of chronic infection, while in the other 4, it was associated with hypertensive cardiovascular diseases. These patients had little fever and few distressing symptoms, but all of them had marked pyuria and bacilluria.

*Bacteriology.* Cultures of the urine were made for two to three days before streptomycin was started, and cultures were repeated at least daily during treatment. The organisms isolated from pretreatment cultures of the urine were first proved to be susceptible to the action of streptomycin *in vitro,* and in most cases to be inhibited by the concentration of the antibiotic expected in the blood and urine. A variety of different gram-negative bacilli were obtained from these cases. Friedlander's bacilli and some of the strains of Aerobacter aerogenes were the most susceptible, whereas Bacillus proteus and two of the strains of Esch. coli were the most resistant of this group.

*Treatment.* Most of the patients were given streptomycin by intermittent intramuscular injections, and the total daily dose was 2 to 6 Gm. given in amounts of 0.5 to 1.0 Gm. every four to six hours. An initial intravenous dose of 0.5 to 1.0 Gm. was given to 19 of the patients immediately before the first intramuscular injection. One patient, whose urine contained Streptococcus viridans as well as a gram-negative bacillus, was given intramuscular penicillin, 320,000 units daily, along with the streptomycin.

*Results.* These cases are divided into two groups. The cases included in groups I and II were comparable, and received similar amounts of streptomycin. The patients in group I(3a) received streptomycin without adjuvant alkali, and the urine was acid before and throughout the course of therapy in 6 of these 7 cases. In 6 patients there was no clinical response, and the pyuria and bacilluria persisted during and after therapy. In 5 of these cases, the organisms recovered from the urine after one to four days of streptomycin treatment showed cultural and biochemical characteristics which were identical with those of the pretreatment strains, except that they were now able to grow well in the presence of 50,000 units of streptomycin. In the sixth case, pyuria diminished and cultures showed no growth on the third and fourth days of therapy, and the reaction of the urine, which was initially infected with *B. proteus*, rapidly changed from alkaline to acid. On the fifth day of treatment, however, pyuria and bacilluria recurred, and the organism recovered on that day and thereafter was a strain of *Esch. coli* which was totally resistant to streptomycin. There

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7. (a) Reimann, H. A., Price, A. H., and Elias, W. F.: Streptomycin for Certain Systemic Infections and Its Effects on the Urinary and Fecal Flora, Arch. Int. Med. 76:269-277 (Nov.-Dec.) 1945. (b) Waksman, S. A., Reilly, H. C., and Schatz, A.: Strain Specificity and Production of Antibiotic Substances. V. Strain Resistance of Bacteria to Antibiotic Substances, Especially to Streptomycin, Proc. Nat. Acad. Sc. 31:157-164 (June) 1945. (c) Knop, C. Q.: Experimental Study of the Development of Resistance to Streptomycin by Some Bacteria Commonly Found in Urinary Infections, Proc. Staff Meet., Mayo Clin. 21:273-276 (July 24) 1946. (d) Miller, C. P., and Bohnhoff, M.: Streptomycin Resistance of Gonococci and Meningococci, J.A.M.A. 130:485-488 (Feb 23) 1946. (e) Youmans, G. P., Williston, E. H., Feldman, W. H., and Hinshaw, H. C.: Increase in Resistance of Tubercle Bacilli to Streptomycin: A Preliminary Report, Proc. Staff Meet., Mayo Clin. 21:126-127 (March 20) 1946. (f) Wolinsky, E., and Steenken, W., Jr., Streptomycin and Penicillin Resistant Staphylococci; Influence of *p*H, Body Fluids on Streptomycin Action, Proc. Soc. Exper. Biol. & Med. 62:162-165 (June) 1946. (g) Alexander, H. E., and Leidy, G.: Influence of Streptomycin on Type b Haemophilus Influenzae, Science 104:101 (Aug. 2) 1946. (h) Klein, M., and Kimmelman, L. J.: The Role of Spontaneous Variants in the Acquisition of Streptomycin Resistance by the Shigellae, J. Bact. 52:471-479 (Oct.) 1946. (i) Graessle, O. E., and Frost, B. M.: Induced *in vitro* Resistance of Staphylococci to Streptomycin and Penicillin, Proc. Soc. Exper. Biol. & Med. 63:171-175 (Oct.) 1946. (j) Sullivan, M., Stahly, G. L., and Birkeland, J. M.: Reciprocal Sensitivities of Staphylococcus Aureus to Streptomycin, Streptothricin, and Penicillin, Science, 104:397 (Oct. 25) 1946. (k) Herrell, W. E., and Nichols, D. R.: The Clinical Use of Streptomycin: A Study of 45 Cases, Proc. Staff Meet., Mayo Clin. 20:449-462 (Nov. 28) 1945. (l) Bondi, A., Jr., Ottenberg, D., Dietz, C. C., and Brown, C. L.: Streptomycin Therapy in Infection of Urinary Tract: Failure Because of Development of Resistance, J.A.M.A. 132:634 (Nov. 16) 1946. (m) Alexander, H. E., Leidy, G., Rake, G., and Donovick, R.: Hemophilus Influenzae Meningitis Treated with Streptomycin, J.A.M.A. 132:434 (Oct. 26) 1946.

Table 1

**Summary of the Results of Streptomycin Treatment in Chronic Urinary Tract Infections, with and without Alkali**

| *Group* | *Number of Cases* | *"Cures"* | *Transient Improvement* | *No Improvement* | *Streptomycin Resistance Developed* |
|---|---|---|---|---|---|
| I—Treated without alkali | 7 | 1 | 0 | 6 | 6 |
| II—Treated with alkali | 14 | 8 | 6 | 0 | 2* |

* In one of these cases the resistant strain was recovered only once after treatment, and subsequent urine cultures were negative. In the other cases, the resistant organism isolated from urine after treatment was different from the one obtained before treatment.

was only 1 case in this group in which the pyuria and bacilluria rapidly cleared and did not return during a four-month follow-up period, in spite of the fact that the urine remained acid throughout the course of treatment.

After observing the unfavorable clinical results in this group, a modification of the therapeutic regimen was agreed upon. Because the activity of streptomycin *in vitro* is known to be much greater in an alkaline than in an acid medium(1a,8), an attempt was made to determine whether alkalinization of the urine during streptomycin therapy would increase the effectiveness of treatment and reduce or prevent the development of resistance. The 14 patients in group II were, therefore, given alkali for two to four days before streptomycin was started. The urine was alkalinized by the oral administration of sodium bicarbonate and potassium citrate, the usual dose being 1 Gm. of each six times daily, and the reaction was maintained at a *p*H above 7.0 throughout the period of treatment.

The clinical and bacteriologic results of treatment in the two groups of cases are summarized and compared in table 1. "Cures" (freedom from bacilluria persisting throughout the period of observation) were achieved in 8 of the 14 alkalinized patients. In one patient, treatment with streptomycin was successful, but reinfection of the urinary tract with a new bacterial strain occurred five and a half weeks after therapy. Transient improvement was noted in 5 patients, who had no bacilluria during the administration of streptomycin, but developed a recurrence of infection within two weeks after therapy was concluded. In 4 of these 5 patients the organisms obtained at the time of recurrence showed the presence of new strains, distinct from those isolated before treatment. Some of the new strains were gram-positive bacteria, having varying degrees of sensitivity to streptomycin, but there were also 3 new strains of gram-negative bacilli, 1 from each of 3 patients, and only 1 of them was totally resistant to streptomycin. The other new strains which appeared after the conclusion of treatment showed about the same degrees of sensitivity as pretreatment strains of similar organisms isolated from other patients. In 2 patients there was a recurrence of the strains which had been present in urine cultures before treatment, and in each instance the organisms had remained sensitive to streptomycin.

*Comment.* A comparison of the results of treatment in these two groups of cases suggests that alkalinization did, indeed, have a favorable influence. Of the 14 patients whose urine was kept alkaline throughout the period of streptomycin therapy, 8 were apparently cured of their infection, whereas only 1 among 7 patients who did not receive alkali was cured by streptomycin therapy. Furthermore, the development of resistance to streptomycin by the infecting organisms was much less frequent when the urine was alkaline. In fact, almost all of the organisms recovered after the streptomycin therapy in this group of patients were different from those obtained before treatment and were susceptible to the antibiotic.

### *Infections of the central nervous system*

Gram-negative bacillus infections of the central nervous system, although infrequent, are usually fatal. Four cases of meningitis and 1 case of an infected meningocele, all caused by gram-positive bacilli and treated with streptomycin, were studied(3c).

Two of the patients had meningitis due to Pseudomonas aeruginosa (Bacillus pyocyaneus). One was a 14-year-old epileptic in whom the infection followed a diagnostic lumbar puncture, and the other was an infant with an ulcerated meningocele. Both had failed to respond to intensive treatment with sulfadiazine and penicillin. Streptomycin was given both intramuscularly and intrathecally in these cases. The first patient had a rapid clinical response, and the spinal fluid cultures were negative for Ps. aeruginosa after the fourth day of treatment. The

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8. (a) Lee, Y. H., et al.: Assay of Streptomycin by the Paper-Disc Plate Method. J. Bact. 50:701-709 (Dec.) 1945. (b) Abraham, E. P., and Duthie, E. S.: Effect of *p*H of the Medium on Activity of Streptomycin and Penicillin and Other Chemotherapeutic Substances, Lancet 1:455-459 (March 30) 1946.

second patient had a more protracted course and required streptomycin for four weeks. The cerebrospinal fluid eventually became bacteria free, but a left facial paresis occurred during treatment and persisted throughout the follow-up period.

Two cases of meningitis due to Hemophilus influenzae, type B, both in infants, were treated by parenteral and intrathecal streptomycin. One patient received no therapy other than streptomycin. The other had been treated for ten days with sulfadiazine and type-specific rabbit antiserum, but showed little or no clinical response; H. influenzae had persisted in the stained smears of the cerebrospinal fluid. Both patients showed a gradual clinical improvement during streptomycin therapy, and in both cases recovery was complete. Smears and cultures of the spinal fluid were negative for H. influenzae after the first day of streptomycin treatment in both instances.

The fifth case was that of a 4-month-old infant who had a B. proteus infection of a congenital meningocele which failed to respond to penicillin and sulfadiazine. Streptomycin was given intramuscularly and was also injected directly into the meningocele sac. Cultures of the meningocele fluid were negative for B. proteus within twenty-four hours after streptomycin was begun. and remained negative thereafter. Clinical improvement was slow until the seventh day, when the intrathecal injections of streptomycin were ended and sulfadiazine was again given. The fever persisted until the tenth day, when the parenteral streptomycin was stopped. There was no recurrence of infection during the follow-up period.

*Comment.* In 3 cases of meningitis, 2 of them caused by Ps. aeruginosa and one by H. influenzae, recovery followed treatment with streptomycin alone. In the other 2 patients recovery was probably due to streptomycin, since the other therapeutic agents used had failed to bring about improvement, and infection persisted until the streptomycin was started.

### *Pulmonary infections*

Studies were made on 6 cases of acute or chronic broncho-pulmonary infections caused by gram-negative bacilli and treated with streptomycin. The acute cases included one of bronchopneumonia due to H. influenzae and 2 of pneumonia due to the Friedlander bacillus. One of the latter patients died.

The patient with H. influenzae bronchopneumonia was critically ill when streptomycin was begun, but he showed rapid and progressive clinical improvement during treatment. Two weeks after therapy was ended, he was essentially asymptomatic and x-rays revealed the chest to be completely clear. An abundant and almost pure growth of H. influenzae was obtained from sputum cultures before treatment, but cultures made twenty-four hours after therapy began, and all subsequent cultures failed to show the presence of these organisms.

A patient with pneumonia and bacteremia due to type C Friedlander's bacillus showed rapid improvement after streptomycin was begun. Blood cultures were negative four hours after the initial dose, but sputum cultures were consistently positive for Friedlander's bacilli. The strain recovered from the sputum before treatment was quite sensitive to streptomycin, but the strains recovered on the second day of therapy and thereafter were highly resistant in vitro to the action of the antibiotic. This patient's course was protracted; multiple abscesses formed in the consolidated right upper lobe, and although streptomycin was subsequently given by aerosolization and large doses of penicillin were given both intramuscularly and by aerosolization, cough and purulent sputum continued for two months. The abscesses healed slowly, and only fibrotic changes remained in the right upper lobe when the patient was discharged from the hospital.

The third case was one of pneumonia of the right upper and middle lobes due to type A Friedlander's bacillus. Blood cultures in this case were negative. Streptomycin was given after six days of intensive treatment with sulfadiazine and penicillin, during which the patient had grown progressively worse. Considerable clinical improvement followed the institution of streptomycin therapy, and Friedlander's bacilli could not be found in smears or cultures of the sputum after the second day of this treatment. On the fourth day of streptomycin therapy, however, the patient died rather suddenly. A postmortem examination showed consolidation and abscesses of the right upper and middle lobes. Type A Friedlander's bacilli were cultured from the consolidated lung, and these had the same streptomycin sensitivity as the pretreatment strain.

The 3 remaining patients had chronic suppurative bronchiectasis. Sputum cultures in one of them yielded Friedlander's bacillus, type A; in the second A. aerogenes and H. influenzae were present: and in the third, the cultures yielded a heavy and almost pure growth of H. influenzae. Each of these strains was sensitive to less than 10 units of streptomycin. The streptomycin was given by nebulization in all of these cases, and 2 patients received parenteral doses as well.

Two of the patients showed a marked reduction in cough and sputum after streptomycin therapy was started, although small numbers of highly resistant organisms were recovered from cultures of the sputum during and after treatment. The resistant organism in one of the cases was identical with the pretreatment strain, but in the other case a different organism was obtained. The third patient eventually proved to have a bronchogenic carcinoma in addition to a widespread and severe bronchiectasis. That patient showed no clinical response to streptomycin treatment, and sputum cultures continued to yield large numbers of H. influenzae. The organisms recovered from the sputum on the second day of treatment and thereafter were highly resistant to streptomycin, as were those recovered from the lung at autopsy.

*Comment.* It is not possible to draw final conclusions as to the therapeutic value of streptomycin in gram-negative bronchopulmonary infections, because relatively few cases have been treated with this drug. This small series and the results in similar cases reported by others(9) suggest that some severe cases may respond favorably to streptomycin therapy.

### *Ear infections*

Studies were made on 18 patients who had persistent purulent drainage from one or both ears, and who were treated with local instillations of streptomycin solutions. A total of 28 suppurating ears were treated: 6 of them were in cases of subsiding acute otitis media, with profuse purulent discharge; 19 resulted from chronic otitis media, and had drained constantly or intermittently over periods of one to twenty-five years; in the remaining 3 ears, the infection was limited to the external canal.

Cultures from 26 of the draining ears yielded gram-negative bacilli, alone or (in 5 instances) mixed with gram-positive organisms. Almost all these organisms were sensitive to streptomycin *in vitro*. Ps. aeruginosa and B. proteus were the strains most frequently isolated. Two of the ears were infected only by staphylococci, and had shown no response to topical instillations of penicillin.

Treatment for the most part was carried out by the patient. It consisted in drying the ear canal and instilling 1 milliliter of a solution containing 1,000 to 20,000 units of streptomycin in saline four times daily. This regimen was continued for one to seven weeks.

In 12 ears, the drainage disappeared during treatment, and did not recur during two to four months of observation. In 13 there was either no response or apparent improvement with a prompt recurrence of drainage after streptomycin was discontinued. In 3 ears the drainage subsided during treatment, but the patients were not followed after treatment. Changes of bacterial flora during treatment and the development of streptomycin resistance were observed frequently in these cases.

*Comment.* The results in these cases were not uniformly favorable. Nevertheless, it is of interest that simple local instillations did benefit some of these refractory cases. Topical instillation alone probably is not the optimum method of using streptomycin in such cases. Further therapeutic attempts with streptomycin administered both locally and parenterally are indicated. The use of a mildly alkaline solution for the local instillations of streptomycin into the ear canal may possibly serve to enhance the antibiotic activity, and deserves a trial.

*Untoward reactions*

The reactions observed in this group of cases were similar to those reported by others. The most frequent was pain and tenderness at the site of the injections. In some cases this became quite severe and was associated with the development of large areas of redness and induration. Various combinations of fever, anorexia, headache, malaise, weakness, urticarial rashes, myalgias, and arthralgias were experienced by several of the patients in the latter part of the course of streptomycin therapy. All of these symptoms, however, subsided quite promptly after the injections were stopped.

Histamine-like reactions were encountered by several patients during intravenous injections of streptomycin, and one elderly man had clonic convulsive seizures. These reactions could usually be minimized or avoided by giving the drug in more dilute solution and injecting it more slowly. Several patients also had mild but transient vertigo during treatment, which cleared up when the streptomycin was stopped. In 3 patients an acute labyrinthine disorder, manifested by slight deafness, vertigo, and instability of gait, developed. The condition cleared promptly in 2 cases, but the vertigo and unstable gait persisted in the third patient for more than three months.

The administration of streptomycin by the intrathecal route was accompanied by fever and pleocytosis of the cerebrospinal fluid in 3 cases.

## *Summary and Conclusions*

This small group of cases suggests that streptomycin, at the present time, has an important place in the treatment of certain infections with susceptible organisms. Some infections with gram-negative bacilli that have resisted therapy with other agents have responded favorably to streptomycin. When given in adequate intramuscular doses and together with alkalis by mouth in sufficient amounts to maintain an alkaline urine, streptomycin may arrest the progress of serious destructive infections of the urinary tract and help to preserve the residual renal function. In meningitis due to gram-negative

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9. (a) Nichols, D. R., and Herrell, W. E.: Streptomycin: Its Clinical Uses and Limitations, J.A.M.A. 132:200-206 (Sept. 28) 1946. (b) Olsen, A. M.: Streptomycin Aerosol in the Treatment of Chronic Bronchiectasis: Preliminary Report, Proc. Staff Meet., Mayo Clin. 21:53-54 (Feb. 6) 1946. (c) Durant, T. M., Sokalchuk, A. J., Norris, C. M., and Brown, C. L.: Streptomycin Therapy in Hemophilus Influenzae Pulmonary Infections, J.A.M.A. 131:194-196 (May 18) 1946. (d) Learner, N., and Minnich, W. R.: Friedlaender Pneumonia Treated with Streptomycin: Report of a Case with Prompt Recovery, Ann. Int. Med. 25:516-520 (Sept.) 1946. (e) Bishop, C. A., and Rasmussen, R. F.: Klebsiella Pneumonia Treated with Streptomycin, J.A.M.A. 131:821 (July 6) 1946. (f) Committee on Chemotherapeutics and Other Agents, National Research Council: Streptomycin in the Treatment of Infections: A Report of One Thousand Cases, J.A.M.A. 132:4-11 (Sept. 7) and 70-77 (Sept. 14) 1946.

bacilli it may be a life-saving measure when given parenterally and intrathecally. It may also have a place in the treatment of acute and chronic bronchopulmonary infections, and may contribute materially to the management of ear infections, particularly those associated with gram-negative bacilli.

Reactions to streptomycin, except for the labyrinthine disorder, are usually transient, but they are more frequent and more disturbing than those resulting from the use of penicillin. The development of streptomycin resistance in initially susceptible organisms occurs quite frequently during therapy, and limits the usefulness of this antibiotic in many cases.

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# MORTALITY IN THYROID SURGERY

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Charlotte

## *Classification of Cases*

In an attempt to classify a large series of goiter cases, certain almost insurmountable difficulties are encountered. The more one tries to correlate the clinical picture with the gross appearance of the excised gland and with its histologic pattern, the more confused he becomes. There is no classification of thyroid disease into which all cases of a large series can be fitted. Neither the Plummer classification nor that advocated by the American Association for the Study of Goiter is entirely satisfactory. There is frequently such overlapping and confusion in the histologic picture that two or more competent pathologists will give conflicting reports which make it impossible to classify the specimen accurately. The clinical picture and the gross appearance of the gland, not to mention the histologic findings, often do not coincide.

It has never been clear to me what is meant by "non-toxic diffuse goiter." Again, why should a "toxic diffuse goiter" (or a diffuse goiter with hyperplasia) be called an exophthalmic goiter when there is not, and never has been, the slightest suggestion of exophthalmos? Nodular or adenomatous goiters constitute a large group with different pathologic entities.

The etiologic factors of goiter, especially hyperthyroidism, are obscure, and it is apparent that hyperthyroidism is not an entity in itself, but is the resultant of various physico-chemical disturbances producing different clinical and pathologic pictures. There must be a "trigger" somewhere which initiates this course of events.

In spite of the difficulties outlined above, I have attempted (table 1) to classify the cases in my series of 1,091 thyroidectomies. I have relied almost entirely on the pathologist's reports, although in a few instances the clinical finding of fulminating hyperplasia is substituted for a pathologic report of *moderate* hyperplasia.

**Table 1**

| *Classification* | *No. Cases* | *Deaths* | *Per Cent* |
|---|---|---|---|
| Diffuse goiter with hyperplasia | 564 | 1 | 0.18 |
| with marked or fulminating hyperplasia | 160 | 0 | 0 |
| with moderate hyperplasia | 404 | 1 | 0.25 |
| Non-toxic nodular goiter | 374 | 3 | 0.8 |
| Toxic nodular goiter | 116 | 0 | 0 |
| Others* | 37 | 1 | 2.7 |
| Total thyroidectomies | 1091 | 5 | 0.46 |

* Including Riedel's thyroiditis, Hashimoto's struma, chronic thyroiditis, simple colloid goiter, abnormally large normal glands, malignancies, and so forth.

### *Diffuse goiter with hyperplasia*

It will be noted that there are 564 cases of diffuse goiter with hyperplasia, 160 of which showed clinically and histologically marked or fulminating hyperplasia—typical Graves' disease. In this subgroup there were no deaths and no semblance of crises; convalescence was generally smooth. These good results are attributed largely to the *intravenous* use of iodine in preparing these patients for operation, and to a reasonably rapid operative technique. The more the gland is manipulated, the less likelihood there is of a smooth convalescence.

In 71.6 per cent, or 404, of the diffuse goiters with hyperplasia, pathologic examination of sections showed moderate hyperplasia. In this subgroup there was one death. The basal metabolic rates in this group varied from minus readings to as high as +60 per cent; they were wholly inconsistent with the microscopic findings, and in many instances with the clinical picture. Many of the thyroid glands in this group were undergoing involution.

Often a patient is referred for surgery with a note reading something like this: "Two months ago she had a definitely toxic goiter. She has been on iodine since and seems much improved." In such cases it is difficult to know exactly what one is dealing with. Many borderline cases with definite early hyperplasia present a real problem in diagnosis. Generally speaking, delay is not dangerous in such cases, and if a policy of "watchful waiting" is followed the disease will manifest itself sooner or later. There is no reason to wait for a full-blown Graves' disease to develop, however, before resecting the gland. It would be just about as sensible to tell a patient with acute appendicitis that it has not ruptured yet, so we'll just wait! In such cases I place much reliance on a therapeutic test with iodine. When a patient who is suspected of having an early toxic goiter shows definite improvement after taking organidin in 10-minim doses thrice daily for two weeks, one can be reasonably sure that the diagnosis of early toxic goiter is correct.

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### *Nodular goiter*

The nodular goiters include the adenomas: fetal adenomas; cystic, degenerating, hemorrhagic adenomas; colloid inclusions, and so on. Those showing hyperplasia anywhere on microscopic examination are classified as toxic nodular goiters. This classification coincides fairly accurately with the clinical findings of toxicity; however, only a few patients have been in a markedly toxic condition. Very likely we do not see the number of severely toxic nodular goiters in this part of the country that are reported in other sections.

This series of thyroidectomies includes 374 nodular goiters classified as non-toxic, with three deaths, and 116 classified as toxic, with no deaths. No malignancies are included in this group(1).

Too often patients with nodular goiters are told that they do not need surgery because "that little lump is not bothering you; your breathing test is normal." There are at least three reasons why *all* non-toxic nodular goiters should be removed: (1) They are not likely to become smaller, but will almost certainly increase in size; (2) they may become toxic; and (3) about 5 per cent of them undergo malignant change. The operative risk in cases of early, small, non-toxic goiters is practically *nil.*

### *Other cases*

In the remaining group of 37 cases, classified as "others," there was one death—in a patient with Riedel's thyroiditis who died of pulmonary infarction. This small group includes the malignancies, Riedel's strumas, Hashimoto's strumas, simple colloid goiters, and abnormally large normal glands. All these conditions are interesting, but will not be discussed in this presentation. There have been no operative deaths following radical or palliative operations for malignancy(1).

### *Distribution of Cases According to Race and Sex*

When the series is broken down into race and sex (table 2), some interesting facts are revealed.

**Table 2**

| *Race and Sex* | *No. Cases* | *Deaths* | *Per Cent* |
|---|---|---|---|
| White | 1016 | 2 | 0.2 |
| Colored | 75 | 3 | 4.0 |
| White females | 925 | 2 | 0.22 |
| Colored females | 66 | 3 | 4.55 |
| White males | 91 | 0 | 0 |
| Colored males | 9 | 0 | 0 |
| Total females | 991 | 5 | 0.5 |
| Total males | 100 | 0 | 0 |

There have been no deaths in 100 males and five deaths in 991 females—two in 925 white females (0.22 per cent) and three in 66 Negresses (4.55 per cent). In this series the distribution of the different types of goiters is about the same in both races and in both sexes. No malignancies have been encountered in 75 colored patients. Contrary to reports from other sections of the country, toxic goiter has been no more severe among the colored than among the white patients—in spite of a mortality or 4.0 per cent in the Negroes and 0.2 per cent in the white patients. This difference in mortality is consistent with that reported in other sections and is hard to explain.

### *Case Histories of the Patients Who Died*

The five deaths were the result of (1) bilateral pulmonary infarction, (2) acute hemorrhagic nephritis, (3) unknown cause, (4) pulmonary embolism, and (5) cardiac collapse (?).

### *Case 1*

A 45-year-old white woman with Riedel's thyroiditis did well for two days following resection; then severe respiratory difficulties developed. After consultation, a tracheotomy was done, with no beneficial results. X-ray of the chest showed bilateral

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1. Brenizer, A. G. and McKnight, R. B.: True Adenomas of the Thyroid Gland and Their Relation to Cancer, Tr. Am. Study Goiter, pp. 176-190, 1940.

pulmonary infarction. She expired on the fourth postoperative day.

### *Case 2*

A 61-year-old white woman complained of loss of weight, nausea, some pain in the left side, and a non-toxic nodular goiter of many years' duration. The urine showed a trace of albumin and an occasional red cell in the high power field.

Her immediate postoperative reaction was entirely normal, but she did not void. A catheterized specimen showed a scant amount of urine, a 4 plus reaction for albumin, and many red cells. She became irrational, lethargic, and almost anuric; her nonprotein nitrogen rose to 365 mg. per 100 cc. of blood. In spite of excellent and vigorous treatment by the referring physician, she expired on the eighth postoperative day, with the thyroidectomy wound healed. The diagnosis was acute hemorrhagic nephritis.

### *Case 3*

This patient was an obese colored woman of 39 years. She had never been seriously ill, but had had a goiter for more than five years. Examination was negative except for a huge, non-toxic, nodular goiter.

Operation, done under cyclopropane-oxygen-helium anesthesia, was very difficult. Her condition was good throughout the sixty-minute operation, but as the muscles were being closed she suddenly stopped breathing. Artificial respiration was begun and breathing was resumed, only to stop again as closure was completed. She did not have a tracheal collapse, nor was there any recurrent nerve injury. A tracheotomy was done, however, and she was placed under an oxygen tent. The usual supportive medication was administered when she was returned to her bed, but she expired about an hour later. The cause of death is unknown, since autopsy was refused.

### *Case 4*

A colored woman, aged 52, had a definite toxic diffuse goiter when she was first seen. A blowing systolic murmur was heard over the base of the heart. The pulse was 122, the blood pressure 150 systolic, 100 diastolic, and the basal metabolic rate +38 per cent. The struma had recently developed. She responded nicely to organidin in 15-minim doses three times daily, and three weeks later subtotal thyroidectomy was easily performed under cyclopropane-oxygen anesthesia. Her immediate postoperative reaction was uneventful, but she expired suddenly on the second postoperative day with typical clinical signs of pulmonary embolism.

### *Case 5*

A very obese colored woman, 53 years of age, had had a large nodular goiter for twenty-five years. Physical examination was negative except for obesity, a large, non-toxic nodular goiter (measuring 14 by 14 by 7 cm. after resection), and a blowing systolic murmur heard over the entire precordium. The blood pressure was 152 systolic, 84 diastolic.

After a reasonable period of rest in bed, thyroidectomy was easily and rapidly performed with remarkably little bleeding. She was not in good condition after operation and did not regain consciousness during the day. At times her respiration was of the Cheyne-Stokes type. During the first postoperative night she suddenly collapsed; an emergency tracheotomy was done and she was placed under an oxygen tent. This was removed the following morning, when she seemed much better. Her voice was normal, and she took fluids and nourishment freely. For two days she did well and was in excellent spirits.

On the evening of the third postoperative day she had another sudden collapse; she complained only of being extremely hot, and expired within ten minutes. An excellent internist who saw her stated that death was not due to embolism.

Autopsy was not obtained, and the death is listed as cardiac collapse. There were some aspects suggestive of a cerebral accident, and death may have been due to this cause.

## *Analysis of Mortality Statistics*

Most internists and surgeons interested in diseases of the thyroid are familiar with mortality statistics from various reported series over the country at large, and with the higher mortality among Negroes, especially in the South. The very low over-all mortality rate in this series compares favorably with other reports. It has been stated that goiter, especially toxic goiter, is not as severe in some sections as in others. This statement may be true, but in this series there were a number of poor-risk patients —several with "burnt-out goiters" and marked cardiac damage. One woman was admitted in violent crisis, and others have been in an extremely toxic condition.

No ligations have been done in this series, and only two operations have been performed in two stages. The use of intravenous iodine and glucose in the toxic cases rapidly prepares the patients for operation(2). It is doubtful if any of the deaths could have been avoided with the possible exception of the second death reported.

### *Factors reducing mortality*

(1) *As accurate a clinical diagnosis as possible,* based upon a good history and careful general physical examination, with the necessary laboratory studies. It is very important that the patient's general condition be thoroughly evaluated. All the patients in this series have undergone complete physical examinations, which were correlated with carefully elicited surgical histories and the necessary laboratory studies.

Many reports of this type list and discuss at length basal metabolic findings. Generally speaking, it has been my experience that such findings are of relative value only, and not infrequently are entirely incompatible with the clinical picture and microscopic pathologic anatomy. One basal metabolic

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2. McKnight, R. B.: (a) The Use of Intravenous Iodine in Preparing the Patient with Toxic Diffuse Goiter for Operation, North Carolina M. J. 7:590-593 (Nov.) 1946; (b) An Analysis of 1,100 Consecutive Thyroidectomies, South. Surgeon, in press.

reading is just about worthless; several, taken at the proper times by the same technician and with the same machine, may be of distinct relative value, particularly in evaluating progress preliminary to surgery in patients with hyperplastic glands. More significant than a decrease in the metabolic rate, however, is improvement in the clinical picture: slowing of the pulse, decrease in nervous manifestations, possibly some gain in weight, ability to hold the breath longer, and especially a better mental attitude and decreasing apprehensiveness. Hertzler was eternally right when he said, "Don't let a tin can do your thinking for you!" Many patients in this series with non-toxic nodular goiter had been told by other doctors to forget it, since the "breathing test" was normal!

(2) *Proper preparation of the patient for operation.* It may be that the three deaths following operation for non-toxic nodular goiter could have been avoided had more accurate evaluation and treatment of these patients been accomplished preoperatively. The efficacy of iodine in the preoperative preparation of the patient with toxic diffuse goiter is well known; it has reduced a mortality of about 25 per cent to the low rate achieved today. The use of intravenous iodine and glucose in these cases has been reported(2).

The cooperation of a good internist, particularly regarding the use of digitalis and quinidine, is invaluable.

(3) *Proper operative technique.* Each experienced thyroid surgeon has his own method of operating, and this should be adapted to suit the individual case. A reasonably rapid technique, good exposure, adequate hemostasis, and avoidance of such structures as the recurrent laryngeal nerves and the parathyroids, help to lower the mortality and morbidity rates.

(4) *Efficient postoperative care and good nursing.* The services of an alert, intelligent, and sympathetic nurse are indeed invaluable. In many cases, the cooperation of a good internist is essential and frequently life-saving.

The "proper selection of cases" is *not* a factor in reducing the mortality from thyroidectomies, unless the surgeon is one who keeps his operative mortality low by denying the poor-risk patient the benefit of thyroidectomy. Successful operations have been performed in a number of toxic cases with serious cardiovascular complications. It is in such cases, especially in the toxic nodular goiters, that the most brilliant results are frequently obtained. There have been no deaths in this series among patients with very toxic diffuse or toxic nodular goiters. The deaths have been in those cases in which the risk ordinarily would appear to be slight.

### *Summary*

A series of 1,091 thyroidectomies, with an over-all mortality of 0.45 per cent, has been reported. In the 1,016 operations performed on white patients, the mortality was 0.2 per cent. This low rate can be achieved by proper study of the patient, adequate preoperative preparation, a reasonably rapid and careful operative technique, and good postoperative care(3).

3. McKnight, R. B.: Some Observations Drawn from a Series of 500 Consecutive Thyroidectomies, North Carolina M. J. 2:369-372 (Aug.) 1941.

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# AN OUTLINE FOR DIAGNOSIS AND MODERN TREATMENT OF CENTRAL NERVOUS SYSTEM SYPHILIS

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Considerable interest in the treatment of syphilis was stirred by the discovery in 1943 that penicillin is an effective antisyphilitic agent. Insufficient time has elapsed to establish the degree of effectiveness of the drug in neurosyphilis. However, results from different investigating clinics have been sufficiently comparable to make possible certain guarded recommendations to the profession.

This outline is designed to give the reader a working basis for the separation of cases into clinical groups, and to offer suggestions for treatment. No single treatise of reasonable length can cover the subject adequately, nor give acceptable directions for the treatment of every case. The management of any individual patient is left to the judgment of the therapist. Data to support recommendations herein made are omitted for sake of brevity. In general, the schedules submitted are more conservative than those which have been utilized by the clinics investigating the effects of the drug.

### *Asymptomatic Neurosyphilis*

Some time during the first few weeks after

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the primary syphilitic infection the spirochetes enter the blood stream and are distributed throughout the body, including the central nervous system. In an estimated 40 per cent of untreated cases the organisms remain within the central nervous system. Symptoms and signs resulting from the infection of the central nervous system do not, as a rule, appear for a number of months or years after the original invasion. During the short or long incubation period the disease is labelled *asymptomatic neurosyphilis,* and since no symptoms or signs are present the infection can be detected only by examination of the spinal fluid. Asymptomatic neurosyphilis is therefore the forerunner of any one of the various types of clinical neurosyphilis. Because results of treatment are best during this early phase of the disease, it is important to establish the diagnosis and administer treatment as soon as possible.

Although in any single case of asymptomatic neurosyphilis it is not possible to determine which, if any, of the clinical forms of the disease will ultimately develop, there are several general principles to consider. Symptoms of syphilitic meningitis appear within three to five years, those of chronic meningovascular neurosyphilis within four to eight years, and those of the several types of parenchymal neurosyphilis within five to forty years following the primary lesion. The longer the spirochetes remain within the central nervous system, the greater is the chance of irreparable damage to the nervous tissues and the greater is the difficulty in eradicating the infection. During the asymptomatic period abnormalities of the spinal fluid may be taken as a rough measure of the infection. A strongly positive fluid—that is, one with increased cell count, high total protein, paretic colloidal gold curve, and a Wassermann positive in high dilution—indicates the presence of an active infectious process which may soon lead to symptoms, or it may point to parenchymal disease which has already begun. A weakly positive fluid, although pointing to infection of low grade, gives no assurance that degenerative parenchymal disease will not develop.

Experience has shown that asymptomatic neurosyphilis of short duration responds well to treatment. Poorer results are obtained in cases of longer duration. Primarily because of this difference in prognosis, it is customary to divide the cases clinically into early and late asymptomatic neurosyphilis.

### *Early asymptomatic neurosyphilis*

The diagnosis of early asymptomatic neurosyphilis is made on those cases with one or more abnormalities of the spinal fluid noted within four years after the primary infection. An elevation in cell count or total protein, or both, is sufficient to establish the diagnosis. The Wassermann reaction and the colloidal gold curve may or may not be abnormal.

In early asymptomatic neurosyphilis, invasion of the central nervous system is of relatively recent origin; the organisms have not obtained a firm foothold, and few irreparable changes have occurred. Results of treatment are very good, but caution is needed in giving a prognosis until two years have elapsed following treatment.

**Treatment:**

1. A total of 3,000,000-4,000,000 units of penicillin, injected intramuscularly in individual doses of 20,000-40,000 units, administered every three hours night and day for seven and a half to fifteen days.

Spinal fluid examinations, including tests for cell count, total protein, colloidal gold, and Wassermann reaction, should be performed every six to eight months until the fluid has been normal for two years. Persistent or recurrent abnormalities in any one of the tests point to inadequate treatment and demand a repetition of the course of penicillin as above described at the end of one year. If this does not serve to reverse the changes and hold the fluid to normal at the end of the second year, fever therapy is indicated.

### *Late asymptomatic neurosyphilis*

This diagnosis is made when the spinal fluid reveals the only evidence of central nervous system infection four years or more after the primary lesion. In cases of this duration, a positive Wassermann reaction is usually obtained, irrespective of the results of the other tests on the spinal fluid. Again, as in the early asymptomatic cases, the degree of the spinal fluid abnormalities is taken as a rough measure of the severity of the syphilitic infection. Because of the longer duration of the infection, it can be assumed that the infectious agent has probably obtained a firm foothold, that it has had ample opportunity to invade parenchymal tissues, and that there is considerable potential danger for the future. Vigorous treatment may be required to eradicate the infection before irreparable damage occurs. The late asymptomatic case is frequently more of a therapeutic problem than early symptomatic cases, especially acute syphilitic meningitis.

**Treatment:**

1. A total of 4,000,000-6,000,000 units of penicillin intramuscularly in individual doses of 25,000-50,000 units every three hours night and day for seven and a half to twenty-one days.
2. Bismuth, 0.2 Gm. intramuscularly every three or four days for five doses.
3. Mapharsen, 0.04-0.06 Gm. intravenously every three or four days for ten doses.

The spinal fluid examination should be repeated every six months after treatment. If, at the end of the first six months, a substantial improvement has not occurred—that is, if cell count and total protein have not returned to normal or approximately normal—a repetition of the course of penicillin is indicated. If the spinal fluid shows a relapse or is persistently abnormal in cell count and total protein at any time after the first follow-up at six months, fever therapy should be administered in addition to a second or third course of penicillin. Each case should be followed until the spinal fluid has remained normal for at least two years.

### *Acute Syphilitic Meningitis*

The symptoms of acute syphilitic meningitis appear earlier than those of any other type of neurosyphilis. Symptoms commonly appear before the end of the third year following the initial infection. If symptoms and signs indicative of syphilitic meningitis appear four years or more after the primary lesion, it is assumed that the illness is an acute flare-up of a chronic process, and therefore is more properly classified as chronic syphilitic meningitis.

Acute syphilitic meningitis is characterized by the fairly rapid onset of headache, lethargy, blurring of vision, stiffness of neck, general malaise, and sometimes symptoms pointing to involvement of cranial or spinal nerves, such as diplopia, deafness, tinnitus, or facial paralysis. Physical examination may show a slight elevation of temperature, stiffness of the neck, pupillary disturbances, papilledema, abnormalities of one or more of the cranial nerves, and, rarely, a positive Kernig sign. The spinal fluid is frequently obtained under increased pressure. The cell count is elevated usually to 80 or more cells per cubic millimeter, with a slight to moderate elevation of total protein. The colloidal gold curve is variable and the Wassermann test is positive, except in a few cases in which symptoms appear within a year or so after the primary lesion.

If no treatment is administered, the acute symptoms usually subside in several weeks. Subsequent exacerbations are to be expected however, and after a variable time the clinical and pathologic picture of general paresis or other types of parenchymal disease may appear. Since the meningitis develops early in the course of syphilis, good results are obtained from prompt antisyphilitic treatment. Indeed, relief of symptoms is to be expected within a few days, and complete reversal of the spinal fluid abnormalities may occur in a few months. However, long experience with acute syphilitic meningitis has demonstrated that relapses are likely to occur even years later and that general paresis is the most common form of parenchymal disease to follow. With careful, long-term follow-up, such complications should be avoided.

The results of treatment with penicillin have been very satisfactory in acute syphilitic meningitis.

**Treatment:**

1. A total of 3,000,000-4,000,000 units of penicillin intramuscularly in individual doses of 20,000-40,000 units, given every three hours night and day for seven and a half to fifteen days.
2. As an added precaution, especially in cases suspected of being chronic, 0.04 to 0.06 Gm. of mapharsen intravenously every three or four days for ten doses immediately following the above course of therapy is recommended.

The spinal fluid should be examined at intervals of four to eight months until two successive normal fluids are obtained; thereafter, every year until the fluid has been normal for five years. A persistently abnormal spinal fluid or a relapse from normal to abnormal after one to one and a half years indicates inadequate treatment and the probability of parenchymal disease. Fever therapy and a repeat course of penicillin are indicated.

### *Chronic Syphilitic Meningitis*
### *Chronic Meningovascular Neurosyphilis*
### *Late Asymptomatic Neurosyphilis with Pupillary Abnormalities*

Within this ill-defined, heterogeneous group are generally placed all cases of neurosyphilis which are of long standing and which exhibit symptoms or signs that do not fit into one of the more well-defined categories. It is assumed that the symptoms and signs in this type of neurosyphilis result from inflammatory changes of the pia-arachnoid membrane, from diseased blood vessels, or from both.

The clinical manifestations in this group are extremely variable. Patients with chronic meningitis may suffer from headache, convulsions, memory defect, or signs of cranial nerve palsies. The spinal fluid usually shows an elevation of the cell count and total protein, and a moderate to strongly positive Wassermann. When the meningitic process is localized over the frontal lobes of the brain, the clinical picture is indistinguishable from that of general paresis. Other patients may be wholly without symptoms but have abnormalities of the pupils. Still others have one or more episodes pointing to vascular occlusions, and, rarely, the clinical picture of transverse myelitis is presented.

Results of treatment vary greatly. In many cases residual neurologic signs persist even though the disease is arrested; some patients make completely satisfactory recoveries; and others develop general paresis, tabes, and optic atrophy.

*Treatment*

It is difficult to make general recommendations for treatment of this group. However, because of the potentially grave outcome, the following outline of treatment should be adhered to in each case.

1. A total of 4,000,000-6,000,000 units of penicillin intramuscularly in doses of 25,000-50,000 units every three hours for seven and a half to fifteen days.
2. Bismuth, 0.2 Gm. intramuscularly every three or four days for five doses.
3. Mapharsen, 0.04 to 0.06 Gm. intravenously every three or four days for ten doses.
4. Follow-up as described under the section on acute syphilitic meningitis.
5. Fever therapy six months after treatment, if clinical and spinal fluid improvement has not occurred.

### *General Paresis*

General paresis is the result of spirochetal invasion of the cerebral cortex. The frontal lobes and margins of the sylvian fissures are the areas chiefly affected. If the disease is not arrested by treatment, insanity, convulsions, general paralysis, and death may be expected in the great majority of cases in a period of several years. Symptoms of general paresis may be insidious, with disturbance in judgment, changes in personality, defects in speech, tremors, and forgetfulness; or they may be of rapid onset, with psychotic behavior. The symptoms result from chronic meningitis, vascular disease, and ganglion cell degeneration.

General paresis is the most difficult of all types of neurosyphilis to eradicate. Until the advent of penicillin, all authorities agreed that fever therapy was essential. At the present time some investigators are obtaining sufficiently good results with penicillin *in early cases* to make possible postponement of fever therapy for two or three months to determine the effect of penicillin.

Many factors play a role in determining the outcome, but among the more important factors is the duration of symptoms. If treatment is instituted within the first two or three months, 65 to 75 per cent of the patients may be returned to their previous socio-economic status. If symptoms have been present for six months or more, less than 50 per cent will be restored. Prompt improvement may follow many types of therapy, but relapse is frequent.

When one is treating a paretic patient, it is advisable to have access to a mental hospital. Behavior is unpredictable, and problems in feeding, sleeping, and so forth are common. Furthermore, the psychosis of general paresis may require the same management as comparable psychoses in non-paretic patients.

**Treatment:**

A. **Early cases** (symptoms less than two months)
  1. Penicillin, 6,000,000-10,000,000 units intramuscularly, 40,000-50,000 units per injection, every three hours for fifteen to twenty-one days.
  2. Mapharsen, 0.04-0.06 Gm. intravenously every three or four days for ten doses.

  If prompt clinical improvement does not occur, or if spinal fluid cell count and total protein have not returned to normal at two to four months after treatment, the patient should have fever therapy.

B. **Late cases** (symptoms more than two months)
  1. Fever therapy, preferably malaria.
  2. **Concurrently**, 6,000,000-10,000,000 units of penicillin intramuscularly, 40,000-50,000 units per injection, every three hours for fifteen to twenty-one days.
  3. Following fever therapy, 0.04-0.06 Gm. of mapharsen intravenously every three or four days for ten doses.

The clinical status and spinal fluid should be followed with great care. Repeat courses of penicillin (although never as beneficial as the first) are often necessary. A second course of fever therapy also may be required, especially if the first course was not malaria. The spinal fluid should be examined every six months, and a gradual reversal of all tests toward normal is to be expected. A majority of cases will require five years for complete reversal. Recurrence of abnormalities in the spinal fluid generally precedes clinical relapse by weeks or months, and indicates the need for more therapy. Because of the tendency of paresis to relapse, it is not safe to discharge patients from follow-up until after the spinal fluid has been normal for several years.

### *Primary Optic Atrophy*

Primary optic atrophy may occur alone or in combination with tabes, general paresis, or both. It most often begins gradually in one or both eyes, and commonly progresses to total blindness within one to three years. When optic atrophy is present alone, it is accompanied by no symptoms other than reduction in vision. Peripheral and central vision are involved. The pathogenesis of optic atrophy has not been proved beyond doubt, but it is probably due to an invasion of the cranial portions of the optic nerves by spirochetes. Experience has shown that, even when it is promptly and thoroughly treated, visual loss may continue for a number of months. It is rare for any patient to regain lost visual acuity. The detection and treatment of optic atrophy at the earliest moment are essential if useful vision is to be preserved.

**Treatment:**

1. Fever therapy, preferably malaria, as soon as diagnosis is made.
2. Concurrently 6,000,000-10,000,000 units of penicillin intramuscularly, 40,000-50,000 units per injection every three hours for fifteen to twenty-one days.
3. Follow-up as in general paresis.

### *Tabes Dorsalis*

Tabes dorsalis is a clinical syndrome due to spinal syphilis. Except for the cranial-nerve and pupillary signs, the symptoms of the disease are explained by inflammation and degeneration of the posterior roots of the spinal nerves. Rarely, anterior roots are also involved. In most cases, symptoms begin gradually and progress only slightly over several years; in other cases, however, symptoms may develop rapidly, and control of the legs and the urinary bladder may be lost within a matter of weeks. In some cases, debilitating illness, exhaustion, poor nutrition, and other factors appear to play a contributory role.

Unfortunately, many of the most distressing manifestations of the disease—visceral crises, lightning pains, Charcot joint, and bladder dysfunction—are only slightly affected by antisyphilitic treatment. If treatment is administered early, ataxia may be greatly benefited, but improvement is usually more dependent upon good nutrition and reeducation of muscles than upon antisyphilitic therapy. However, in spite of the fact that many symptoms and signs of tabes are residual and secondary phenomena, the first aim of treatment is to prevent progression by administering antisyphilitic therapy to arrest whatever inflammatory or degenerative process may be present.

The diagnosis of tabes is usually not difficult. The physical examination reveals irregular, unequal pupils which do not react to light, lightning pains, ataxia, positive Romberg sign, loss or reduction in vibration and position sense in the lower extremities, reduced deep-pain sense, atonic bladder, and absent tendon reflexes in the legs. Occasionally, however, when only a few signs are present, it is difficult to establish the diagnosis. Most authorities would accept the diagnosis of tabes in the presence of a positive spinal-fluid Wassermann test if any one of the above listed signs, excluding the pupillary irregularities, are present. The spinal fluid is variable in tabes. In some patients it shows the strong "paretic formula," while others have completely normal fluids ("burnt-out tabes"). More commonly, however, the several tests show slight to moderate abnormalities.

The tabetic patient frequently requires general medical, nutritional, and physical therapy, as well as antisyphilitic treatment. Cases with normal spinal fluid may need no antisyphilitic treatment. Patients with optic atrophy or general paresis should be treated by the methods outlined for those conditions. Fever therapy, which is required in a high percentage of cases, should not be debilitating, lest symptoms and signs of the disease, especially bladder dysfunction, be exaggerated.

**Treatment:**

1. Penicillin, 6,000,000-10,000,000 units intramuscularly, 40,000-50,000 units per injection, every three hours for fifteen to twenty-one days.
2. Fever therapy two to three months later if clinical improvement is not prompt and definite; also if spinal fluid cell count and total protein have not returned to normal six months after penicillin therapy.
3. Spinal fluid should be examined every six to eight months after treatment until it remains negative for two years. A recurrence of abnormal findings in the fluid indicates need for repetition of the course of penicillin.
4. Attention should be directed to nutrition, reeducation of limbs, and bladder function.

### *Fever Therapy*

The usefulness of fever therapy in neurosyphilis has been well established. The exact mechanisms by which it helps to bring about recovery are not known. Since the body temperature cannot be raised safely to the thermal death-point of the spirochetes, however, it may be presumed that the effect of fever is to aid the body's defense against the infection.

Several means of elevating body temperature have been devised. Each method has its proponents, but difference of opinion regarding the relative value of each method is less marked than in former years. All forms of fever therapy carry risk for the patient. Fever therapy should be administered only in a hospital, and by physicians who have gained experience in its use.

1. *Malaria* is the form of fever therapy most widely used, and there is little doubt that it produces the most satisfactory results. Benign tertian malaria is generally employed, although quartan malaria may be substituted in patients with natural or acquired resistance. In experienced hands, therapeutic malaria carries only slight risk for patients who are physically fit. It is not safe in patients with cardiac, renal, or liver disease and is contraindicated in patients who have had recent pyogenic infections.

2. *Mechanically induced fever* requires special equipment, a well-trained nurse-technician, and a physician experienced in hyperthermy. Although fever induced by this method ranks close to malaria in its therapeutic effectiveness, the above requirements make its use impracticable except in large treatment centers. Because the temperature elevation can be well controlled, and because the fever is not usually debilitating, mechanically induced fever is particularly useful in patients with tabes dorsalis and in other patients with poor nutrition or frail physique.

3. *Protein shock*, by intravenous injection of stock typhoid vaccine, is another widely used method of induction of therapeutic fever. Although it is relatively easy and safe, the results obtained in general paresis and optic atrophy by this method are distinctly inferior to those obtained with malaria and the fever cabinet. In other types of neurosyphilis, the results reported in the literature are more satisfactory.

### *Conclusions*

A brief outline of the development, clinical picture, and treatment of the several types of neurosyphilis is presented. Case reports, statistics, and other details are omitted. Some of the recent original articles are appended for reference(1-9).

1. Penicillin is a potent therapeutic agent in all forms of neurosyphilis. It is of value only when activity of the syphilitic disease is present. The spinal fluid is the best guide to activity.

2. Cases of neurosyphilis treated with penicillin require careful clinical and spinal-fluid follow-up for many years in order to detect evidence of a possible relapse. Repeated courses of treatment are often necessary.

3. Cases of late asymptomatic and parenchymal neurosyphilis which do not show progressive improvement in the spinal-fluid abnormalities should have fever therapy.

4. Patients with optic atrophy or general paresis who have had symptoms for two months or more should have fever therapy, preferably malaria, and penicillin simultaneously as soon as the diagnosis is established.

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# THE PSYCHIATRIC ASPECTS OF GYNECOLOGY AND OBSTETRICS

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In medical education today, increased emphasis is being placed upon the teaching of psychiatry. The prevention, early recognition, and intensive treatment of the more serious mental reactions are stressed. Of more practical significance to the man preparing for general practice or for one of the non-psychiatric specialties is the acquisition of the psychiatric point of view in the treatment of all patients. The evolution of this role of psychiatry in medical education and practice is definitely associated with, if not the result of, the great success of modern scientific methods in medicine.

## *Advances in Scientific Knowledge Responsible for Neglect of the Emotional Factor*

During the past seventy-five years, mankind in western civilization has reached a high level of physical health, largely as a result of these methods. We are apt to take modern standards of health for granted, but they are maintained through a constant application of our knowledge of disease and its prevention. This application of knowledge is illustrated in the sanitary measures safeguarding our food and water supplies, and in the immunizing procedures protecting us all from diseases which often proved fatal in former centuries. Our many technical devices and methods in diagnosis have enabled us to achieve a high degree of precision in the application of preventive and curative measures. The discovery of microscopic organisms as the cause of disease transformed the practice of medicine. This knowledge, followed by the application of antisepsis, asepsis and other technical improvements, made possible surgery as we know it today. The development of powerful and specific drugs also has done much to combat disease. We are familiar with the advances which these scientific contributions have made possible in the fields of obstetrics and gynecology.

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It is not surprising that while the medical man was learning and mastering this great body of scientific knowledge, his attention was turned from the patient as a person. This statement was certainly never true of all physicians, even those most skillful in technical procedures. The gynecologic and obstetric patient, furthermore, has a way of demanding this consideration of herself as a person, even from those with little innate ability or training in the psychiatric point of view. In the days before the dawn of modern scientific medicine, however, the physician had to depend more upon his understanding of the patient's family background and temperament, her whims, personal peculiarities, and idiosyncracies. This is an approach as old as the first wise physicians. Certainly the position of the old family doctor afforded an excellent opportunity for the development of this point of view. Often his good results were based largely upon his thorough knowledge of the patient's personality and his ability to teach her and influence her through suggestion, reassurance, and persuasion.

In presenting the psychiatric aspects of gynecology and obstetrics, I do not wish to minimize the importance of all the praiseworthy technical advances in the specialties. They are standards which must be maintained, improved, and refined by the trained workers in the field. I do wish, however, to emphasize the role of the emotions and the importance of taking into consideration the psychologic make-up of individual patients.

## *Psychiatric Factors in Gynecologic Disorders*

### *Dysmenorrhea*

In eliciting personal histories and personality development from our patients with mild or serious psychiatric disorders, psychiatrists encounter many distorted ideas associated with the beginning of menstruation. The phenomenon is interpreted by some as an injury. Others believe they are suffering from a serious disease, which they interpret as a punishment, while others react with feelings of shame or disgust. Frequently these attitudes are found in patients who complain of dysmenorrhea. When the organic factors have been ruled out by careful gynecologic examination, we should investigate the psychologic and emotional aspects of the problem. In addition to misinterpreting the phenomenon originally as being due to injury or disease, such girls are apt to reject their feminine role.

In a study of 50 women patients who were addicted to alcohol, we found that 40 of them suffered from dysmenorrhea. Most of them had had previous medical treatments, including glandular therapy, but the symptoms had persisted. Our gynecologic consultant found no organic basis for the complaint. Our psychologic studies did reveal that these women repudiated their femininity. Menstruation was disgusting to them, and had been interpreted as an insult or injury to a self-centered or narcissistic type of personality, one aspect of a faulty adjustment to marriage and motherhood. The presence of actual organic disease does not preclude the presence of emotional and psychologic difficulties, and if the patient with gynecologic complaints is given the opportunity to unburden, many distorted notions can be corrected and the patient can be taught what is the normal or average wholesome attitude about this physiologic phenomenon.

### *Frigidity and dyspareunia*

The problems of frigidity and dyspareunia, when organic factors are ruled out, are usually a part of a complex neurosis which requires psychiatric treatment. The psychic representations of the generative organs, together with emotionally toned misconceptions and strivings in the development of the individual, have a structure or psychopathology which is more complex than the anatomy, physiology, and pathology with which the gynecologist is familiar. In undergraduate and graduate medical education, we are attempting to teach this concept. In practice today the neurotic complaints of frigidity and other such serious maladjustments require the cooperation of the gynecologist and the psychiatrist for the best results in treatment.

### *The menopausal syndrome*

The menopause is the period of a woman's life when we see a significant correlation of physiologic and psychologic factors. Most medical men are familiar with the dramatic physical changes—the cessation of menses, the loss of the power to conceive, and the associated glandular changes. Of greater importance are the psychologic forces at work in women who have trouble at this time. We are aware of the many serious physical diseases such as carcinoma and hypertension which occur during these decades. Careful physical examinations at intervals, and medical and surgical treatment if indicated are unquestionably recommended, but we must be familiar with the psychologic aspects of this epoch to be of service to our patients. The woman feels that she is not needed by her children and family; there is a tendency to be hypochondriacal; and there are preoccupations with death. With a loss of physical beauty, there are feelings of neglect and jealousy. Sometimes increased erotic drives may bewilder and embarrass the patient. Worries over finances may be indicative of her general feeling of insecurity. An investigation of such personality factors should accompany the regular physical examinations.

The physician as a sympathetic listener can be of great assistance in the act of the patient's unburdening. He can then teach the woman in simple and understandable language what is going on. The successful adjustment involves a graceful changing of attitudes and the adopting of new interests in the home and in the community. The patient must realize that the adjusted woman after the menopause must be different from what she was before. She must learn to grow old gracefully and change her interests and attitudes, so that she feels that her life is useful to the community as well as to her family, who have grown and changed. A little guidance in this sphere of a woman's life is fully as helpful as sedative and endocrine preparations.

### *Psychiatric Factors in Obstetrics*

It is beyond the scope of this paper to take up in detail the serious psychiatric disorders associated with pregnancy and childbirth. It should be stressed, however, that except for the acute delirious reactions on a toxic or infectious basis, the mental manifestations are no longer spoken of as postpartum psychoses, but are classified according to the symptoms. We speak of a manic-depressive, schizophrenic, or neurotic reaction which is precipitated by childbirth. The mental illness is an expression of the personality and the constitution which is attempting to adjust to this life situation. This tragic complication is not very common, occurring about once in every thousand births. Such patients require treatment in mental hospitals.

In the specialty of obstetrics, we are impressed with the great progress which has been made and the praiseworthy refinements in technique. The prenatal care, the management of labor, and the postpartum care of the mother and baby approach perfection in many of our hospitals. At the same time, the woman may be neglected as far as her personality and emotional reactions are concerned. The patient as a person may be wrought up and tense, and burdened with many distorted notions about what she is going through. She may receive much advice and many suggestions from relatives and friends, who only increase her fear and anxiety. There is no subject, unless it be death, that is surrounded by more superstitions and false beliefs.

In considering the psychologic aspect, I do not mean to imply that the attention to the patient's physical well-being is to be minimized. I do recommend, however, that more attention be given to the patient as a person. It has been said that the obstetrician should be the ideal person to practice mental hygiene. He sees the patient at an important period in her own life: the time of the launching of a new one. During the prenatal period, the woman has the opportunity to unburden many distorted notions and beliefs and can receive through simple teaching correct and constructive attitudes. In this way a great deal of needless suffering and tension can be relieved. The calm and poise of the mother have a far-reaching effect upon the mental health of her child and of the family group.

### *Pregnancy*

We are familiar with many of the personality changes which occur in the average woman during pregnancy. In some we see an exaggeration of unpleasant traits. The husband should know about this, and be taught to have an understanding and tolerant attitude. On the other hand, the normal joy and exuberance of some young mothers may be irritating to the young husband who is beginning to feel the pressure of increased responsibilities, especially when the wife gives him the feeling that she is now definitely outdoing him in this new accomplishment. The matter of sex relations should be discussed with both husband and patient. Needless conflict and friction are caused by not facing this problem squarely and with common sense.

The psychologic aspects of the nausea and vomiting of early pregnancy, when all physical causes have been ruled out, are worthy of our attention. Nausea is frequently an expression of uneasiness in adjusting to something new—a denture or a new pair of shoes, for example. We must remember that a person can be of two minds about one thing at the same time. Women of deep maternal feeling and disposition may entertain contrasting feelings, or ambivalence, as it is called, in regard to pregnancy. Their casual or accidental remarks and dreams may show a rejection, even though consciously they may want a baby. Nausea and vomiting may express this rejection. Our language graphically portrays the emotional value of the individual's antipathy to any idea or state, when we say that she cannot swallow or stomach a certain thing. A discussion of such concepts by the obstetrician with the pregnant woman, together with positive and constructive suggestions, has proven helpful.

Among intelligent girls we frequently meet with the misconception that kissing causes pregnancy and that babies are born through the rectum. Even today certain primitive people believe that sexual intercourse has nothing to do with impregnation. They believe that seeds from certain plants must be eaten to produce offspring. We also know that many people can "stomach" or "swallow" risque stories about the gastrointestinal tract and its functions, but will wince at any story about the genitals or their functions. Such emotionally toned attitudes may be at the basis of the gastrointestinal tract's expression of emotional conflict when the individual is in the early stages of pregnancy.

### *Labor*

Today we meet a great many young women who have achieved success in business or professional careers prior to marriage and childbirth, and who are resentful of having to devote most of their drives and energies to the domestic adjustment, or who think the maternal career is of minor importance and can be naturally and easily pursued in an offhand way without fully committing themselves to the undertaking. It is among such women that we find mothers who are poorly prepared psychologically and emotionally for the adjustment demanded by childbirth. Some women think that childbearing will cause irreparable damage to their physical beauty, or that all sex attraction and drive will be lost. Dr. Frederick W. Dershimer(1) has shown that such mental attitudes have a marked influence on the length of labor—but of more importance for the present argument is the fact that the patient can be given a point of view vital to her present and future mental health.

### *The postpartum period*

It is well for those who are around the young mother after delivery to take into consideration the effect of exhaustion on the mother's first response to her baby. In many instances there is a lack of interest or rejection at first. This may be due to a low level of energy. A more common-sense explanation for a young mother's lack of enthusiasm for her baby may be that she has not had time, or is not given time to become acquainted with her child as a person, and most of her attention is centered on her own pride of achievement in production. Under these circumstances a casual word or look of disapproval is enough to stir up needless guilt. In our well organized hospitals, we have to a great extent neglected the mother-child relationship. Nurses are forced to put schedules and routines ahead of the

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1. Dershimer, F. W.: The Influence of Mental Attitudes in Childbearing, Am. J. Obst. & Gynec. 31:444-454 (March) 1936.

mother's desire to get to know her baby, and in many hospitals, if the mother is not nursing her child, she may see it only once a day. For the rest of the time she is pampered with presents and flowers and has no opportunity to realize her real function. Then comes the sudden descent to all the realities of home adjustment, which can be catastrophic for many mothers unless adequate help is available. We should give more thought to establishing the mother-child relationship while they are still in the hospital. Trained help at home for a few weeks is also most important, and I have always recommended this for women who have had previous mental disorders.

### *Conclusion*

The maternal state has something more than its anatomic, physiologic, pathologic and surgical aspects. There is a psychologic structure in the personality of the woman who is passing through this biologic experience which may fit in naturally and harmoniously with what is actually occurring, but which may also be distorted and poorly organized. If this state can be corrected or ameliorated, we are administering psychotherapy of long lasting value to the family and to society.

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# LOCATING THE APPENDIX

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The appendix may be located anywhere inside or outside the abdominal cavity that it can reach. The deciding factors involved are:

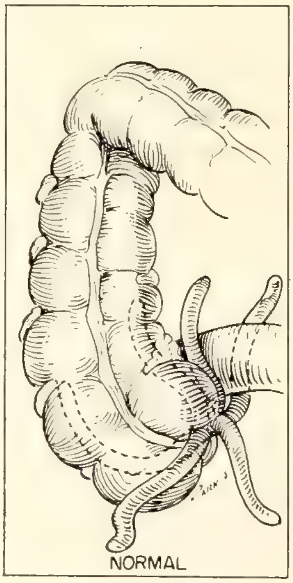
1. **Opportunity for egress from the abdominal cavity.**
2. **Position of cecum as affected by embryologic development.**
3. **Presentation of cecum as affected by rotation.**
4. **Mobility of cecum.**
5. **Peritoneal relations of cecum and appendix.**
6. **Length of meso-appendix.**
7. **Length of appendix.**
8. **Direction in which appendix lies.**
9. **Situs inversus.**
10. **The constant relationship that the appendix bears to the longitudinal bands of the cecum and to the ileo-cecal junction.**

The tenth factor listed above constitutes the salvation of the patient and surgeon. It is the constant in a long list of variables. An appreciation of this factor and a knowledge of the variables provide the surgeon with a simple and confident approach to his problem when the appendix is hard to find.

### *Possible Positions of the Appendix*

Having recognized the fact that the first nine factors in the above list allow a wide range, we realize that the appendix may be practically anywhere in the abdomen, in the fossae, pouches, and canals thereabouts, or in any region with which the abdomen may normally or by anomaly or pathologic process communicate. Thus, in the case of a ruptured diaphragm or a congenital diaphragmatic hernia, the appendix may be entirely inside the thoracic cavity. It may be in the scrotum in an inguinal hernia, or in the thigh in a femoral sac. As a matter of fact, if the hernia is a sliding one of the cecum, the appendix may be in the scrotum or thigh outside the sac. It is frequently outside the peritoneal cavity in the abdomen, lying behind the colon, across the kidney, over the ureter, or back of the duodenum and pancreas. Not infrequently it is located retroperitoneally behind the terminal ileum.

An appendix 10 inches long, starting at any place that the cecum may be located and proceeding in any direction from its base, can really go places. A fine knowledge of anatomy and an excellent technique may be necessary to dissect it out without injuring important structures. Incidentally, the interpretation of symptoms and physical findings in persons with such appendices acutely inflamed may present difficult problems.



**1. Conventional drawing, showing the locations and relations of the appendix.**

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* Chief, Surgical Service, Alamance General Hospital; University of North Carolina Medical School, 1918.

### *Location of the Normally Placed Appendix (Fig. 1)*

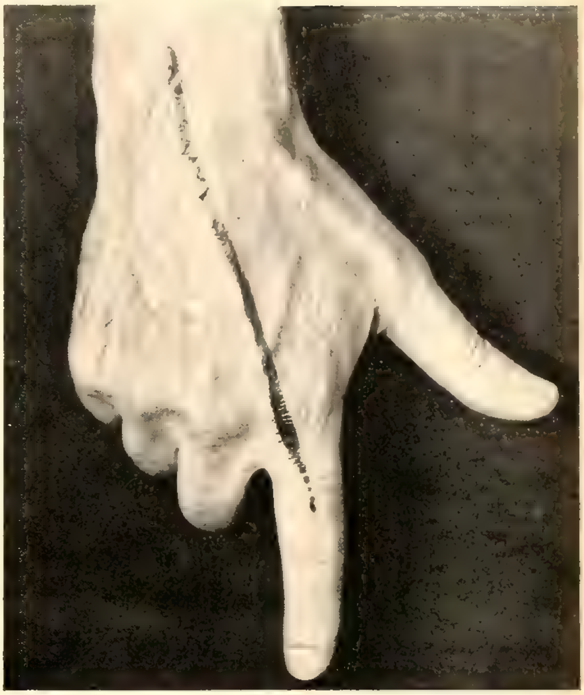
If the surgeon is operating through the usual McBurney incision, he will, in a large percentage of cases, find the appendix quite easily with his trained fingers, or else will recognize the cecum by its relatively white color contrasted to the pink or more variable color of the adjacent coils of small intestines. When a fairly mobile cecum is lifted up, some part of the appendix usually appears. If the appendix is acutely inflamed and is bound in with an inflammatory mass, the whole of which is stuck together and covered with lymph and fibrinous exudate, the problem then is one of recognizing cleavage planes and separating them. That is a problem of technique and is outside the scope of this paper. We are concerned with discussing a method for determining the anatomic location of the appendix.

### *Location of the Abnormally Placed Appendix*

If the appendix is difficult to locate, it is wise to cease hunting directly for it, enlarge the incision adequately, and proceed on the basis of item 10 of the foregoing list. An attempt is first made to identify the junction of the small and large gut. This identification in itself may be difficult, but the ileo-cecal junction is the basic anatomic landmark. If it is hidden high behind the cecum, however, the surgeon will follow the ileum as far as he can and then project in his mind the probable point of junction. The appendix is found by following one of the longitudinal bands of the large gut to the base of the appendix. The longitudinal bands run from the appendix to the rectum. The importance of identifying the ileo-cecal junction lies in the fact that, in the presence of anomalies, it is frequently difficult to be sure in which direction to proceed along the longitudinal band. If one knows where the ileo-cecal junction is, he knows which way to go and approximately how far.

*A useful analogy*

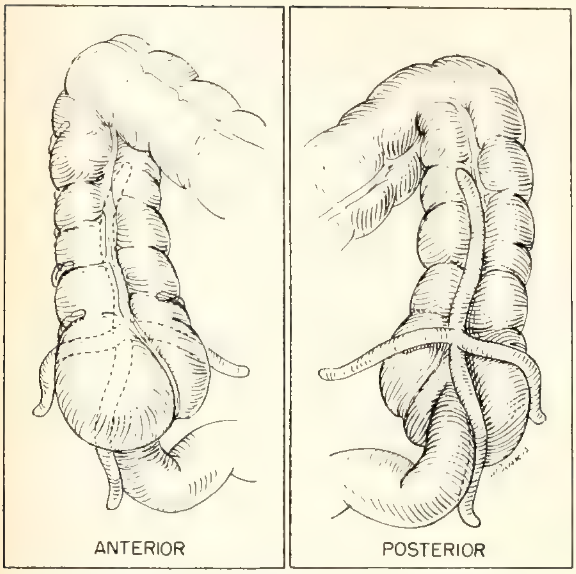
The relationship of terminal ileum, cecum, ascending colon, longitudinal band, and appendix is well illustrated by the components of the right hand and forearm (fig. 2). The thumb represents the terminal ileum. The wrist and forearm represent the ascending colon. The hand with middle, ring and little fingers closed represents the cecum. The extensor tendon to the index finger represents a longitudinal band on the cecum, and the index finger represents the appendix. These relations, in our experience, are constant for hand or gut. The relative positions remain the same, regardless of contortions.



**2. Photograph of right hand, with extensor tendon to index finger inked in to represent longitudinal band on cecum. Thumb is analogous to ileum, hand to cecum, wrist to ascending colon, and index finger to appendix.**

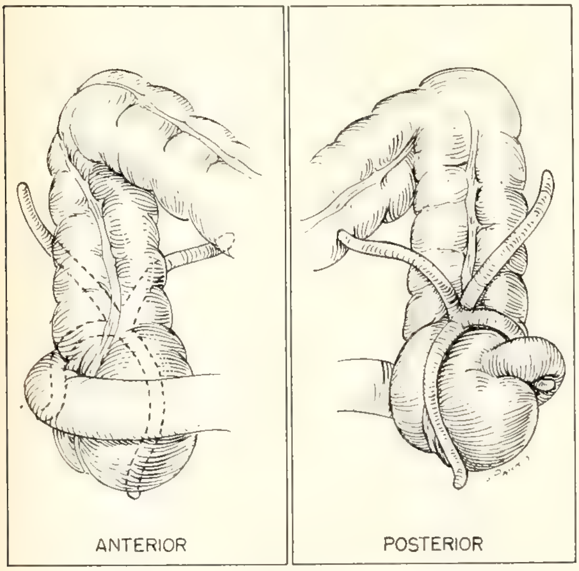
In this comparison, if the index finger were to assume all the possible positions of the appendix, it would have to be attached to the hand by a universal joint, so that in addition to being extended and folded into the palm it could also be moved behind the thumb, along the ulnar side of the hand, and over the dorsum of the hand. Furthermore, supination and pronation of the hand would have to allow 360 degrees of motion in order for the thumb to simulate all the positions of the terminal ileum in that plane, for the ileum may enter the cecum from front, back, or either side (fig. 3, 4, and 5). To get to the lateral side it may cross the cecum in front or behind. Flexion and hyperextension of the wrist also serve to illustrate other relationships of the cecum and ascending colon to the ileo-cecal junction and appendix. If the hand were boneless, the similarities would be greater.

The peritoneal relationships of the appendix in this analogy to the hand can be

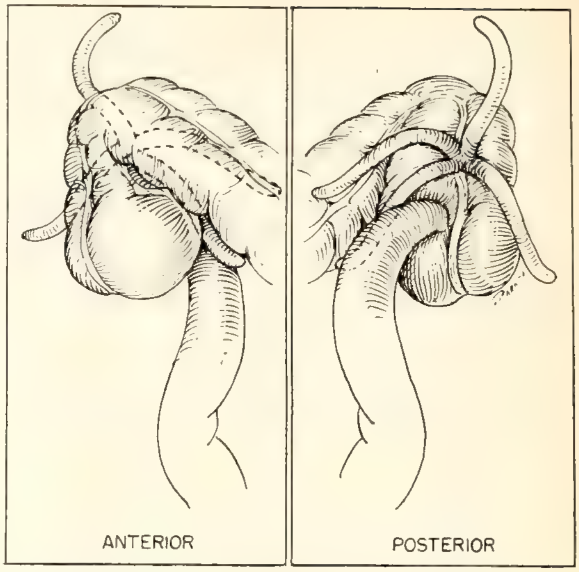


**3. Anterior and posterior views, showing locations of the appendix when the terminal ileum enters the cecum from below and behind.**

illustrated by using a handkerchief to represent the peritoneum and spreading the handkerchief so as to cover more or less completely the wrist, hand, thumb, and index finger, allowing only some provision for the entrance of a blood supply. Any degree of coverage used will find a counterpart in the abdomen, as regards the relationship of terminal ileum, cecum, and appendix to the peritoneum.



**4. Anterior and posterior views, showing location of appendix when the terminal ileum crosses in front of the cecum to enter it from the lateral side.**



**5. Anterior and posterior views, showing location of appendix in right upper quadrant when the terminal ileum enters the cecum from behind. In this condition there frequently is no descending colon.**

In this visual comparison of hand to gut we find these anatomic parts holding similar constant relations:

**Right Hand**
**Thumb = Ileum**
**Wrist = Ascending Colon**
**Hand (with middle, ring and little fingers closed against palm) = Cecum**
**Extensor tendon to index finger = Longitudinal band**
**Index finger = Appendix**

The simple conception outlined above often helps to locate the appendix and to be sure of its relationships. The surgeon just places his right hand in a position as nearly like that in the abdomen as he can, then by analogy deduces the location of the appendix.

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**Discovery of a new germ-killing agent,** isolated from California Spanish Moss, has been announced by the U. S. Public Health Service. The crystalline substance, newest on the long list of materials tested for disease-destroying properties, appears to have an inhibiting effect on the process of tuberculosis in guinea pigs, according to Dr. Alfred Marshak of the Tuberculosis Control Division. The effect of the agent on the progress of tuberculous disease in humans has not been determined since no human testing has been done.

The agent was isolated and the subsequent experimentation conducted by the Division's Field Studies Section at the Hopkins Marine Station and the Rockefeller Institute for Medical Research.

California Spanish Moss, a lichen technically known as **Ramalina reticulata,** grows on the west coast of North America from California to Alaska. —NCTA News Letter, April, 1947.

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**Veterans filing applications** for hospital or domiciliary care continue to total around 70,000 monthly, Veterans Administration said.

# SOME CONTRIBUTIONS TO PERIPHERAL VASCULAR PHYSIOLOGY AND THEIR THERAPEUTIC IMPLICATIONS

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Rational therapy of any disease depends upon a thorough knowledge of the physiology of the systems involved. Such a knowledge not only enables the therapist to institute procedures that tend to restore normal function, but also prevents him from inadvertently employing measures that might augment some of the disturbances already present. Of no other field is this statement more true than of peripheral vascular disease, where the use or abuse of relatively simple therapeutic methods may determine the survival of limbs and even of life itself. For this reason, and also because of the increasing incidence of peripheral vascular disease in our aging population, it has seemed worth while to measure with accuracy the circulatory effects of various therapeutic procedures that have been or might be used in the treatment of peripheral vascular disease. The following is a partial account of these studies, which are still in progress.

## *The Effects of Venous Occlusion*

Largely because of a misinterpretation of earlier physiologic studies on reactive hyperemia(1), the method of intermittent venous occlusion was devised for the treatment of peripheral ischemia, on the theory that it would cause the blood flow to be increased through the areas where the venous pressure was elevated(2). The fallacy of this concept has been proved by the results of four different methods of study on human extremities(3).

When a blood pressure cuff placed proximally on a limb was inflated to pressures greater than the venous pressure but less than the diastolic, the following effects were noted: (a) the velocity of blood flow distally through the cutaneous capillaries was observed microscopically to be decreased, (b) the temperature of the digits was found to be reduced as compared with that of the opposite control limb, (c) the blood flow measured plethysmographically in an entire segment of the limb was decreased, and (d) the arterio-venous oxygen difference of the blood in the limb was increased. There were no signs of an increase in the circulation during inflation of the cuff; on the contrary, there was every indication of a decrease.

It is true that for a short period *after release* of the venous congestion in normal subjects the blood flow, as measured plethysmographically, was slightly increased. This reactive hyperemia after release of the compression was perhaps one of the best evidences that a decrease in blood flow had occurred during the previous congestion. However, like the reactive hyperemia which occurs after release of an arterial occlusion, it apparently did not repay the debt incurred during the previous obstruction of the circulation. Moreover, as others(4) have demonstrated, in limbs with continuous, severe ischemia the mechanism of reactive hyperemia already is operating maximally and cannot be increased by further reduction of the blood flow.

### *Therapeutic implications*

These results indicate that continuous or intermittent occlusion of the venous circulation in a limb by inflation of a blood pressure cuff to pressures greater than venous, but less than arterial, does not increase the blood flow distally, but, on the contrary, decreases it. Since in severely ischemic limbs an increase in blood flow appears to be the primary therapeutic need, the use of any procedure that would increase ischemia, even intermittently, seems contraindicated. It cannot be denied that intermittent venous occlusion might promote lymphatic drainage or produce some other desirable physiologic effect. It seems doubtful, however, that such possible beneficial effects could outweigh the ill effects of further ischemia.

## *The Effects of Arterial Compression*

Studies with cuffs on the limbs were then extended to include observations of the circulatory effects of pressures greater than

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From the Evans Memorial and Massachusetts Memorial Hospitals and the Boston University School of Medicine.

* University of North Carolina Medical School, 1931.

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diastolic, but less than systolic arterial pressure(5). When proper pressures (selected by trial and error) were used in such cuffs placed proximally on a limb, the arterial pressure recorded distally through a needle connected to a Hamilton manometer was found to exhibit a most remarkable reaction. There was an immediate *increase* in the distally recorded diastolic pressure, resulting in a sizable elevation of the distal mean arterial pressure. The distal venous pressure rose immediately in the same way as when subdiastolic pressures were used in the cuff, except that the rate at which it rose *increased in proportion to the height of the distal mean arterial pressure.* However, when too-high cuff pressures were used, there was an immediate lowering of the distally recorded systolic, diastolic and mean arterial pressures, and the distal venous pressure rose more slowly.

Only with a limited range of cuff pressures was there an immediate increase in effective arterial pressure distally. Within this range, blood flow recorded plethysmographically was found to be definitely greater than that obtainable with any subdiastolic pressure in the cuff. However, it is important to point out that such increases in blood flow were only of brief duration, because the associated rise in venous pressure was great enough to impede blood flow in the manner described above. Moreover, unless exactly the right cuff pressures were used, the distal arterial pressure and blood flow were decreased rather than augmented.

The proper cuff pressures could not be selected in advance, but had to be determined by trial and error while the distal arterial pressure or blood flow was actually being recorded. Not only was the range of favorable cuff pressure usually narrow, but it varied markedly in different individuals and even in the same limb under different conditions. The range was wider when the blood flow distally was severely reduced prior to the experiments, or when the systemic arterial pulse pressure was large. These considerations and other collateral observations led to the conclusion that the mechanism by which this method enhanced the diastolic arterial pressure was a reduction of the regurgitant or retrograde flow that has been shown to occur in peripheral arteries during diastole(6). The cuff evidently acted as a peripheral valve to prevent the backward movement of blood in the artery whenever pressure in the artery fell below the pressure in the cuff. The retention of this additional volume of blood in the distal arterial segment increased the pressure within it and the outflow distally from it.

### *Therapeutic implications*

These results demonstrate that intermittent arterial compression by means of a proximal cuff inflated to exactly the right pressures can cause an increase in blood flow distally. The correct range of pressure is narrow and unpredictable, but is wider when there is a large pulse pressure or a markedly reduced peripheral blood flow (with considerable retrograde arterial flow during diastole), or both. Thus a beneficial effect on blood flow would be more likely to occur (with *any* supradiastolic but subsystolic cuff pressure) in just those patients most in need of it—namely, those with generalized arteriosclerosis associated with peripheral ischemia and a wide arterial pulse pressure. This mechanism might be the explanation of some of the good results reported to have followed intermittent inflation of cuffs on ischemic limbs.

For general use as a practical method of therapy, however, the value of this procedure seems doubtful. In the first place, one can never be sure he is increasing arterial pressure and flow distally unless he is actually measuring them. Therefore, he has no way of selecting either the pressure or the time intervals at which the cuff should be inflated. Furthermore, there is a possibility of decreasing the flow distally, a certainty of decreasing it locally(7), and a probability of traumatizing the tissues, and especially the veins, directly beneath the cuff. For these reasons the method would appear to be of little value in the routine treatment of peripheral vascular disease.

### *The Effect of Local Compression*

Careful measurements of skin temperature, plethysmographic blood flow, and ar-

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terio-venous oxygen difference in limbs, before, during, and after local application of pressures ranging from 10 to 60 mm. of mercury, have consistently shown blood flow to be reduced proportionately to the pressure used(7). Even mild local compression (10 to 20 mm. of mercury) definitely restricted blood flow, and reactive vasodilatation, if present, was not compensatory either during the compression or after its release.

Part of the reduction in flow undoubtedly was due to the immediate increase in local venous pressure and the associated decrease in the arterio-venous pressure gradient. Possibly part of the reduction was due to the decrease in caliber of the compressed vessels and the resultant increase in frictional resistance. In any case, the reduction of blood flow occurred immediately, and persisted with no evidence of even a temporary augmentation locally during compression. After release there was a short period of reactive hyperemia, which appeared to be related more to the degree of the previous compression than to its duration.

### *Therapeutic implications*

These results clearly show the detrimental effects of even small increments in local pressure upon blood flow in normal limbs. Presumably in limbs with ischemic vascular disease these effects are greater. The implications are obvious that compression severely restricts the circulation locally. This should be borne in mind when bandages, splints, casts, elastic stockings, or even light coverings are applied to the limbs of patients suffering from peripheral vascular disease. Everyone treating such patients has observed the detrimental effects produced by the pressure even of the bedclothes upon the body prominences. The weight of the patient himself obviously is most important, and is the direct cause of decubitus ulcers. Every effort should be made therefore to avoid, or at least intermittently to relieve, these types of compression. The patient himself must be taught the dire consequences of local pressure, especially those of tight shoes, stockings, bandages, dressings, and corns or bunions, upon ischemic feet. Probably no other mechanical factor is as important in the management of these patients as the avoidance of areas of pressure.

## *The Effect of Elevation and Dependency*

Elevation of the limbs above the heart level decreases blood flow through them whereas dependency increases the flow(8). Despite this well established fact, many clinicians continue to advocate elevation and to advise against dependency of the limbs of patients with peripheral ischemia. Most such patients, if left to their own devices, will place their ischemic limbs in a dependent position, the only ill effects of which appear to be local dilatation of the veins and the accumulation of edema fluid. Even these undesirable effects can be avoided by moving the limbs alternately from a dependent to a horizontal position.

Observations of skin temperature of the extremities during ordinary Buerger's exercises indicate that peripheral blood flow is definitely increased as compared with that in motionless limbs(9). Exercises of the same type, done passively instead of actively, appear to have the additional advantage of avoiding the proximal vasodilatation which results from exercise and diverts a large amount of blood from distal ischemic areas. Furthermore, such passive exercises are the only ones possible for severely ischemic limbs that suffer intermittent claudication on active movements. Accordingly, a machine was devised that performs this service for such patients(10). Preliminary results from the use of this type of device are encouraging.

### *Therapeutic implications*

It seems obvious that ischemic limbs should never be raised above the heart level, but on the contrary should be lowered at times to a dependent position. By placing them alternately in a dependent and a horizontal position, the ill effects of continuous dependency can be avoided, while the beneficial effects on blood flow are retained. Passive raising and lowering of the limb appears to be preferable to active exercises in most patients with severe peripheral vascular disease. More work must be done to determine the long-range clinical effectiveness of this form of therapy.

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### *Summary*

Physiologic studies have been made of the circulatory effects of four different types of mechanical procedures applied to the limbs: venous occlusion, arterial compression, local compression, and alternate dependency and elevation.

Venous occlusion decreases blood flow distally while the venous pressure is increased. Arterial compression at certain selected pressures temporarily increases blood flow distally while the mean arterial pressure is increased, and before venous pressure rises high enough to impede blood flow. Compression of a limb reduces blood flow locally. Dependency of a limb increases blood flow; and alternate dependency and elevation to the horizontal level have a similar effect, but prevent the formation of edema. The implications of these results upon the treatment of peripheral vascular disease are discussed.

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# BIOPSY OF THE LIVER

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The importance of the liver in clinical medicine has been recognized since the days of antiquity. It was not, however, until recent years, when various functions of the liver began to be studied in detail, that the true significance of liver sufficiency began to be realized. Even now, this subject has not been completely explored. However, the development of physiologic facts and biochemical methods of studying function in the living patient have been of increasing value.

The morbid anatomist of a few decades ago, who classified diseases of the liver into various forms of cirrhosis, has now been superseded by the clinician, who studies the liver in its functional phase. The former made his observations on the far-advanced lesion associated with death. The latter studies the relatively early lesion in the living. Biologic and chemical experimentation is being correlated with structural change. For instance, the relationship of choline, methionine, and cystine to changes in the liver, both necrotizing and scarring, has been well investigated in animals. Dietary insufficiency involving certain of the vitamins has also been studied. Numerous poisons, both organic and inorganic, have been investigated. The effect of specific virus infestations in the liver has come up for considerable study, particularly during the past few years. The important part played by the liver in shock and in resistance to trauma and infections in general is now being investigated.

### *Tests of Liver Function*

Most of the clinical studies have been made by the utilization of certain tests regarding the functional status of the liver. While many tests have been devised, they are all broadly related to a study of certain general functions of the liver. Among these functions are the excretion of bile pigment, the metabolism of various forms of sugar, the ability of the liver to conjugate substances that would otherwise be injurious, the excretion of phthalein dyes from the blood stream, the excretion of phosphatase, the formation of prothrombin, the esterification of cholesterol, the part played by the liver in the formation of plasma albumin, and the changes in the conjugation of plasma globulin. Often it is necessary to study the liver with various tests to determine the efficiency of some of the above functions. Such studies usually make it possible for one to state whether or not the liver is severely damaged. Often these tests will also give accurate information as to the nature of the damage.

Broadly speaking, these tests make it possible to differentiate between toxic destruction or inflammation in the liver parenchyma and pure mechanical obstruction of the bile ducts, either within the liver or in the extrahepatic system. Frequently, however, such obstruction of the hepatic duct is also associated with inflammatory changes within the liver and, as a result, the differential diagnostic value of such tests is greatly impaired. Again, many of these tests are too often not sufficiently discriminating, and their interpretation thus may be misleading.

### *Methods of Biopsy*

Obviously, the diagnosis of liver dysfunction would be much easier if we were able to correlate findings in these functional tests with the morphologic and particularly cytologic changes that occur in the liver. It is not surprising, therefore, that considerable effort has been made to provide such correlation. The most accurate means of investigation would be a laparotomy in which the entire liver is exposed, examined grossly, and a small portion of it removed for microscopic study. Unfortunately, people who have severe liver damage become poor operative risks. The danger of anesthesia and surgical trauma is so great that in many instances such an exploration for diagnostic reasons alone is precluded. Furthermore, such a procedure is painful and the patient is subjected to a considerable hospital stay, which makes it economically inadvisable.

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Study of the liver by use of the peritoneoscope has been recommended by many. This procedure too, however, has many shortcomings. Only the surface of the viscus can be observed, and the impression received from such inspection is often fallacious. Furthermore, no morphologic correlation is offered.

Since the development of needle aspiration of the liver a few years ago, much progress has been made. It is possible to aspirate, with relatively little danger, a small fragment of liver tissue, which can be studied microscopically. Another advantage of this procedure is that the physician can make repeated studies and follow the development of the lesion. It also has its shortcomings, however. Unless the liver is diffusely involved by the lesion, the biopsy may not be taken in the proper place. Where obstruction exists, the nature of the obstruction can not usually be determined. The study of lobular arrangement and relationships is likewise unsatisfactory.

### *Surgical removal of biopsy specimen*

Several years ago, it occurred to us that in certain cases a biopsy specimen obtained surgically through a small incision made over the liver might afford more complete study of the liver than was possible with needle biopsy. Some of the results of this procedure are reported in this article.

A small incision, generally 4 to 6 cm. long, is made transversely over the margin of the right lobe of the liver. This is done with an anesthetic consisting of novocaine block combined with a basal anesthesia which is determined by the condition of the patient. The rectus muscle is split, the fibers gently separated, and the peritoneal cavity opened. With such an incision, it is possible to see a considerable portion of the right lobe of the liver. A finger can be inserted and even more of the liver palpated. It is possible to examine the gallbladder, to feel the common bile duct and pyloric region, the omentum, the right portion of the transverse colon, and the peritoneum. If ascitic fluid is present, it can be aspirated. It is fairly simple to remove one or more segments of liver tissue for microscopic study. Hemorrhage is never significant, and can be controlled with a single suture. The operative procedure takes only a few minutes and is not disabling. The postoperative discomfort is slight, and the patient generally never misses a meal.

So far, approximately 50 patients have been studied by this method. It has not been a routine procedure, but has been employed in cases where it was felt that a positive diagnosis was essential, and that a method should be employed which would not upset the patient too much.

The findings in several patients so examined are described briefly below. While the pathologic features in many of these cases are of great interest, complete classification of the pathologic findings will not be attempted at this time.

## *Presentation of Cases*

### *Case 1*

A 56-year-old white man was admitted to the Barnes Hospital in December, 1944. His chief complaint was nosebleed, which had been occurring off and on for approximately one year. He began drinking at about the age of 16, and had consumed from one quart to one gallon of whiskey per week for a number of years. For one year before admission he had had epigastric fullness and a yellow color in the whites of his eyes. He had been weak, and had lost 21 pounds.

On physical examination the patient appeared chronically ill and emaciated. His skin was slightly yellow. There was a generalized glandular enlargement of moderate degree. The chest was normal, except for a few moist rales at the bases. The liver could be palpated at the level of the umbilicus. It was firm, tender, and non-nodular. The remainder of the physical examination was within normal limits.

Laboratory data showed 2,800,000 red blood cells, 8 Gm. of hemoglobin, and 6,890 white blood cells in the peripheral blood. Differential examination of the blood smear revealed 27 normoblasts, 2 pronormoblasts, 3 reticulocytes, 2 myelocytes, 3 juveniles, 3 non-segmented polymorphonuclears, 28 segmented polymorphonuclears, 40 lymphocytes, and 13 monocytes. The picture suggested a leukemoid reaction, probably the result of carcinoma of the liver. The urine and stool were normal, the Kahn test was negative, the icterus index 20 units, cephalin flocculation test 3 plus. All other examinations were within normal limits.

The diagnostic problem presented here was to decide whether this patient had a carcinoma of the liver, cirrhosis of the liver associated with carcinoma, or cirrhosis of the liver alone. It was impos-

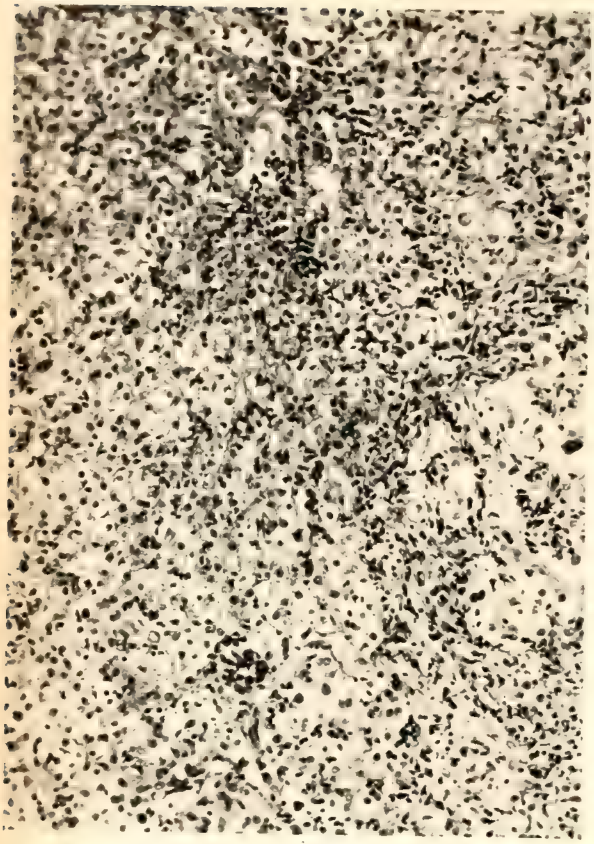

**Fig. 1. Massive, fulminant liver damage.**

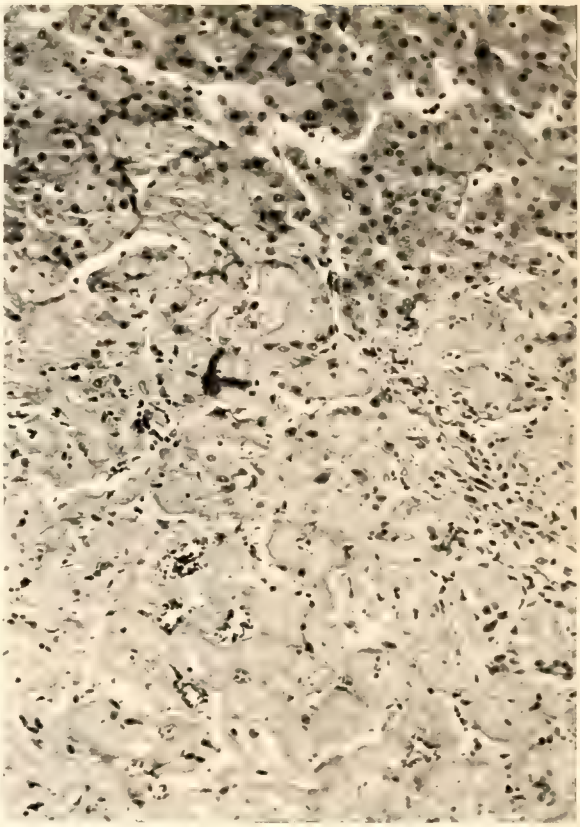

**Fig. 2. This picture is one occasionally seen following the action of certain poisons upon the liver.**

sible to make a differential diagnosis from the data at hand.

Accordingly, a segment of liver was removed for biopsy through an incision 5 cm. long made over the liver edge under local anesthesia. The liver was smooth, and no nodules were seen. Small, grayish lines could be seen very faintly throughout the liver.

The microscopic picture seen in the biopsy specimen (fig. 1) was one of diffuse hepatic degeneration, with scarring and inflammatory infiltration. There was a moderate amount of parenchymatous regeneration. The architecture of the hepatic lobules had become altered, and it was obvious that if this patient survived the acute degenerative phase of cirrhosis, a hobnail cirrhosis would eventually develop. The picture was highly suggestive of that produced by nutritional insufficiencies, with superimposed toxic damage.

The patient ran an intermittent fever for several weeks. He was given many transfusions, supportive vitamin therapy, and a high-protein, high-carbohydrate diet. On January 30, however, he began to bleed from the nose, lungs and intestinal tract, and died that evening.

### *Case 2*

A 29-year-old single girl entered Barnes Hospital July 25, 1945, with a history of hypochromic anemia which had been present for about two years, in a mild form. This anemia had not responded particularly well to liver extract or iron. About six months before admission to the hospital, she began to note increased weakness. This gradually became more pronounced, until upon admission she was confined to her bed. There had also been considerable nausea, vomiting, and loss of appetite.

The important physical findings upon her admission to the hospital were limited to a slight enlargement of the liver, the edge being palpable 3 cm. below the costal margin, and evidence of recent moderate loss of weight.

The red blood cell count was 3,520,000 and the hemoglobin 10.6 Gm.; the white blood cell count was normal, as was the differential count. Repeated extensive studies of the bone marrow and peripheral blood failed to reveal any abnormality other than the mild anemia. The stool was guaiac-positive (1 plus). The urine consistently showed a 2 plus reaction for albumin. The blood protein, nonprotein nitrogen, and blood sugar were all normal. Repeated examination of the stool failed to reveal any parasites, although a moderate amount of blood was always present. The concentration diuresis test revealed a relatively poor ability to concentrate urine. The oral hippuric acid test was normal.

For diagnostic purposes it was thought wise to examine a segment of this patient's liver microscopically. Accordingly, on August 1, 1945, under local anesthesia, the liver was explored through an incision 5 cm. long over the edge. The liver was soft, brown, and mottled, but presented no nodules or increase in size. Microscopic examination of the biopsy specimen showed a rather characteristic picture (fig. 2) There were numerous focal areas resembling coagulation necrosis, such as is frequently noted in animals suffering from chronic carbontetrachloride poisoning.

When the patient was questioned further, she finally admitted that she had noted pinworms in her stool approximately a year ago, and that for the past six months she had been taking medicine for this condition which she had procured from a local druggist. This medication was discontinued, and she responded rapidly.

### *Case 3*

An 18-year-old white, unmarried female student entered the Barnes Hospital on May 17, 1945 and died on May 24. Her chief complaints were abdominal pain, distention, and malaise. Approximately four months prior to her admission she had noted the onset of generalized fatigue and malaise, which failed to improve even with adequate rest at night. About four weeks later she experienced a three-day episode of pain in the right flank which was made worse by deep inspiration. This subsided, but returned in three weeks. The malaise and weakness were associated with a loss of appetite but no nausea or vomiting. Approximately six weeks before admission the pain in the right flank returned, and tended to radiate to both shoulders. Two weeks prior to entry she began to detect gradual abdominal distention, and had frequent episodes of vomiting. She became faintly jaundiced, and for two days before admission had difficulty in voiding. There was no history of chills or fever. She had lost 7 pounds in weight.

The positive findings on physical examination were limited to the abdomen. The abdomen was tense, and shifting dullness was demonstrable in both flanks. The liver was palpated 10 cm. below the right costal margin; the edge was very firm, tender, and smooth. During the patient's stay in the hospital the liver gradually increased in size and the spleen became palpable.

Laboratory tests showed a moderate secondary anemia and an icterus index of 30. The cephalin flocculation test was negative and sternal marrow studies were normal. The stool was positive for stercobilin.

A differential diagnosis was difficult. The picture resembled a primary tumor of the liver, but this was thought unlikely because of her age and the acuteness of the lesion. The evidence of infection in the liver was slight, however, and the findings did not suggest a degenerative process. Accordingly, on May 23 a biopsy specimen was removed from the liver through a transverse incision made at the level of the umbilicus on the right side. A portion of the rectus muscle was severed, and the margin and undersurface of a very large liver were exposed. Approximately 1500 cc. of bloody fluid was aspirated from the peritoneal cavity. The liver was mottled, nodular, and hard. The nodules were dark yellow, and the picture grossly resembled either primary carcinoma or xanthomatosis. A small piece was removed for biopsy without bleeding. The wound was closed with interrupted silk sutures.

Microscopic studies of the tissue (fig. 3) showed a rapidly growing, diffusely infiltrating primary carcinoma of the liver. There was very little evidence of scarring, and very little degeneration was present.

The patient died on May 24, and at autopsy there was found a primary carcinoma of the liver involving all lobes, with invasion of the small radicles of the portal and hepatic veins. Numerous small areas of metastatic carcinoma were seen in all the lobes of the lungs.

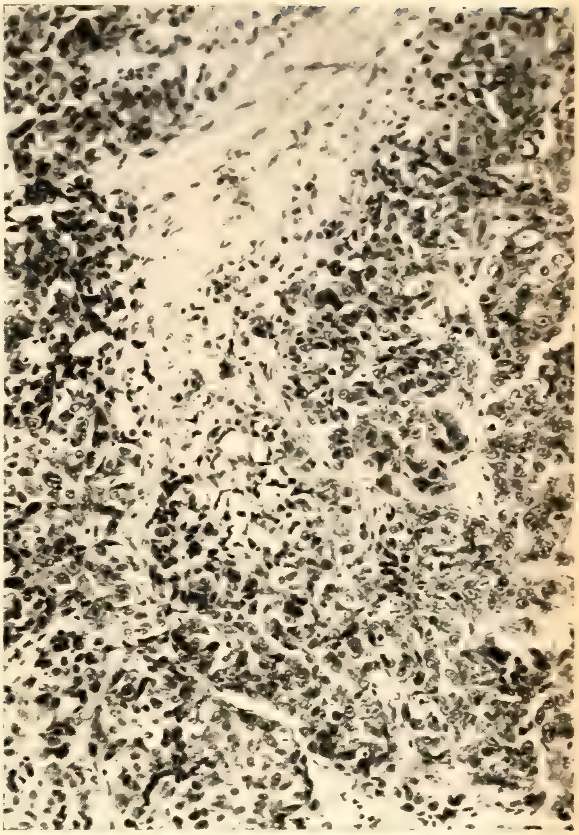

**Fig. 3. A rapidly growing hepatic cell carcinoma.**

### *Case 4*

A 58-year-old white male was admitted to the Barnes Hospital on September 16, 1944, because of a large inguinal hernia which he had had for some time. His past history indicated that he had had a penile lesion twenty years before, and was treated with arsenic and mercury injections. He had had epilepsy for more than twenty years and he had been a heavy drinker for ten years, although more recently he had not had any alcoholic beverage at all. The hernia had been present for approximately ten years. About one year before admission he began to have anorexia and constipation, with a weight loss which amounted to 34 pounds. His extremities became very thin, and six months before entry his abdomen began to enlarge.

Upon admission to the hospital, his temperature, pulse and respiration were normal. The positive physical findings were limited chiefly to those relating to the abdomen. The patient, however, showed considerable emaciation; there were distended venules over the cheeks and nose, and he possessed "liver palms." While there was no cardiac enlargement, a systolic murmur was heard at the base of the heart and there were signs of fluid at the left lung base. The abdomen was distended and a definite fluid wave was noted on palpation. The abdominal veins were dilated, and the liver could be felt 4 cm. below the costal margin. There was a large scrotal hernia. No ankle edema was present.

Laboratory examinations revealed the red cell count, the white cell count and the hemoglobin to be normal. The nonprotein nitrogen was normal. The plasma proteins were 4.4 Gm. per 100 cc.—3.2 Gm. of albumin and 1.2 of globulin. The icterus index was 6 units, and an intravenous hippuric acid function test showed 59 per cent excretion. The Kahn test was questionably positive. Bronchoscopic examination showed evidence of external pressure on the left side. Cell studies of both pleural and peritoneal

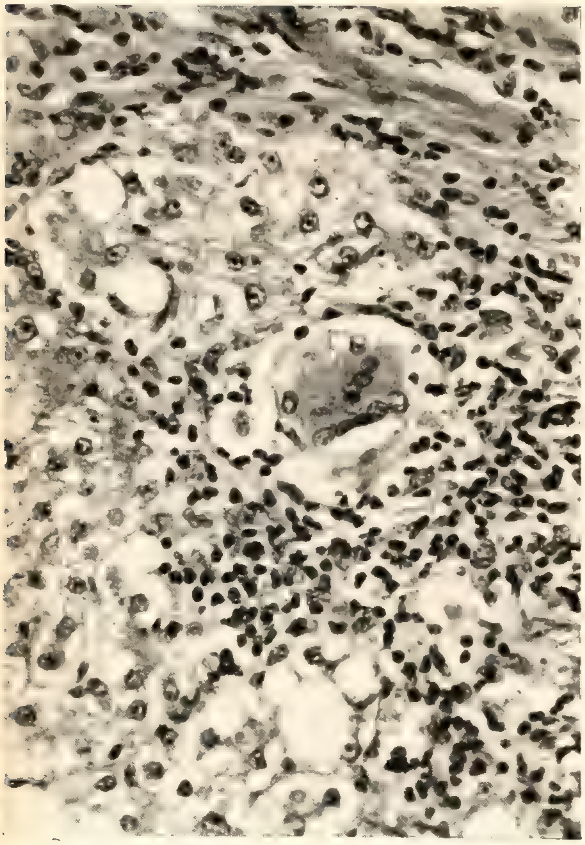

**Fig. 4. The appearance here is typical enough of tuberculosis to warrant active efforts to demonstrate the organism.**

fluid showed questionable adenocarcinoma; the findings were not characteristic enough for a positive diagnosis to be made.

Although the physical findings and history were highly suggestive of cirrhosis of the liver, the laboratory findings were not in keeping, and primary carcinoma of the liver could not be excluded.

On October 16, under local anesthesia, a 3-cm. incision was made over the liver edge. The peritoneum was entered and the liver came immediately into view. It was studded with small, pearl-gray nodules which were irregular, hard, and discrete, each nodule measuring about 3 mm. in diameter. Similar nodules were found on the omentum. One was removed from the omentum, and a block of liver containing one of these small nodules was excised. Figure 4 is a photomicrograph of one of these small nodules. One sees a fairly characteristic granuloma composed of lymphocytes, epithelioid histiocytes, and giant cells. In none of these granulomas was there caseation. The picture, however, was entirely suggestive of tuberculosis, and this diagnosis was subsequently confirmed by inoculation of pleural and ascitic fluids into guinea pigs.

### *Case 5*

A 48-year-old colored male was admitted to the Barnes Hospital on October 12, 1944, sixteen months after he had first noted pain in the right upper quadrant. This pain first began in June, 1943, and was of a mild, recurrent type. In October, 1943, there had been an episode of jaundice while he was confined in a neighboring hospital with an illness diagnosed as bronchopneumonia. Since the onset of his pain he had become progressively weaker. In January, 1944, ten months before his admission to the hospital, he began to notice abdominal swelling and dyspnea. He saw his physician, who told him that his liver was enlarged. He lost 35 pounds of weight during the eight or ten months before admission. The abdominal distention and dyspnea had become progressively worse, and he had had nausea with vomiting on three occasions about three months before admission to the hospital. There was no pain associated with eating, and he had had no bloody or tarry stools or hematemesis. A history of improperly treated syphilis at the age of 22 was obtained.

On physical examination the pulse, respiration, and temperature were found to be normal. The patient was a poorly developed, emaciated, colored male with extreme abdominal distention, shifting dullness, and a fluid wave. Telangiectatic vessels were present over the left deltoid and right femoral regions. There was no jaundice. A soft systolic murmur was heard over the aortic area at the base; no thrills were present. There was a distended inferior epigastric vein along the costal margin. The abdomen was asymmetrical because of the presence of a bulging mass in the right flank. Palpation revealed a large nodule in the right flank which was apparently connected with the liver. The liver surface was nodular elsewhere and the edge, felt 15 cm. below the costal margin in the midclavicular line, was firm; the liver was very tender.

The red blood cell count was 3,500,000, the hemoglobin 10 Gm., the white cell count 12,500, with a slight shift to the left in the Schilling hemogram. The urine had a specific gravity of 1.008; a few granular casts and white cells were seen microscopically. The stool was guaiac-negative, and the blood Kahn was positive (40 units.)

During the patient's stay in the hospital two paracenteses were done and about 11,000 cc. of fluid was removed. This was a clear, yellow fluid with a specific gravity of 1.013. There were 340 cells present in a low power field before acetic acid was added, and it contained 2.1 Gm. of protein per 100 cc.; none of the cells appeared malignant. The cephalin cholesterol test was 1 plus; the total serum proteins were 6 Gm. per 100 cc.—3.4 Gm. of albumin and 2.6 of globulin. The bromsulfalein test showed 50 per cent retention after thirty minutes. Fluoroscopy gave a suggestion of enlargement of the ascending aorta at the base, but x-ray and barium swallow studies did not confirm this. Gastrointestinal x-ray examination was normal.

The differential diagnosis rested between syphilitic cirrhosis, carcinoma of the liver on the basis of cirrhosis, and hypertrophic nodular cirrhosis. The patient was given antisyphilitic treatment for two weeks with no improvement. A diagnosis being impossible to establish, Dr. Kemler removed a section of the liver for biopsy on November 4. This procedure was carried out through a small incision made in the upper right quadrant over the liver edge, under local anesthesia. The liver was noted to be nodular and lobulated, many of the lobules being as big as one's fist. There were huge veins running across the liver, and many dilated venules and arterioles. Several broad white scars were seen throughout the liver parenchyma. The liver was extremely large, extending in every direction as far as a finger could reach; it felt hard. Two biopsy specimens were taken.

Figure 5, which is a photomicrograph of one of the specimens, shows the picture of primary carcinoma of the liver parenchyma involving damaged liver cells. Studies of other portions of the specimens revealed a fairly classic type of Laennec's cirrhosis, upon which was superimposed carcinoma of the liver.

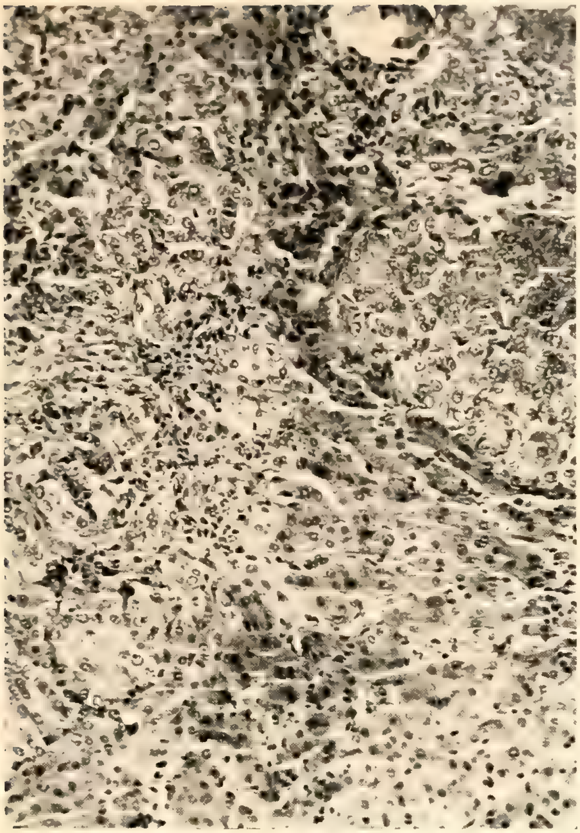

**Fig. 5. Carcinoma of the hepatic cells arising in a liver previously damaged by cirrhosis.**

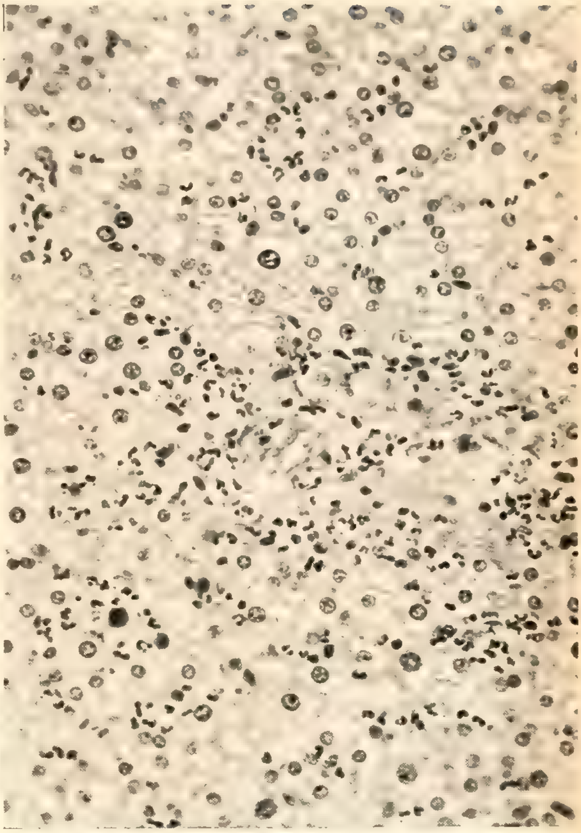

**Fig. 6. This picture is that usually seen in diffuse pyogenic invasion of the liver secondary to some process draining into the portal system.**

### *Case 6*

A 28-year-old single girl was admitted to the Barnes Hospital for an operation to correct deformity of the nose. Without the surgeon's knowledge, she had been on a strict reducing diet of approximately 1200 calories for three months before entering the hospital. Although no liver function tests were performed before operation, the physical examination and routine laboratory findings were within normal limits.

The operation was a long one, requiring ether anesthesia for more than two hours. Forty-eight hours later she began to have pain in the right upper quadrant, radiating to her back. This rapidly became worse, and within a few hours was associated with chills and a temperature of 39.5 C. (103.3 F.). Marked rigidity and tenderness were present in the upper right quadrant. Her pulse rate became extremely rapid, and the blood pressure began to fall. She was given several blood transfusions.

A history of a severe enteritis a year before her admission to the hospital was obtained from her physician. The differential diagnosis lay between acute cholecystitis and an acute infectious process in the liver resulting from the previous enteritis, upon which was superimposed dietary insufficiency and a surgical procedure.

Because of her serious condition it was thought wise to make a small incision over the liver margin to investigate the condition of the gallbladder and the liver. The peritoneum was opened through a 5-cm. incision, and no free fluid was found in the abdomen. The liver was considerably enlarged, extending down almost to the umbilicus, and was extremely soft and mushy. The gallbladder, cystic duct, and common duct were normal, and there were no stones. The head of the pancreas was normal, as were the stomach and the first and second portions of the duodenum. The tissues around the kidney showed no evidence of infection. The only pathologic process that could be made out was in the very soft, large liver. Accordingly, a diagnosis of acute, diffuse pyogenic hepatitis was made, and a biopsy of the liver was made to verify this opinion.

Microscopic examination of the biopsy specimen showed the picture of acute inflammation (fig. 6). The sinusoids were filled with polymorphonuclear leukocytes, and the liver cells showed a picture resembling cloudy swelling. There was a granular change throughout the cytoplasm of the liver cells, together with considerable edema and poorly defined cell membranes. Many of the cells were vesicular and contained vacuoles. The nuclei varied considerably in size, and many of them showed evidence of acute degeneration.

Because of the diagnosis so made, it was possible to treat this patient effectively with antibiotics. Recovery was rapid.

## *Discussion*

There is always considerable danger attached to the formulation of a rigid classification of diseases of an organ, when the nature of some of the diseases is poorly understood. With the present information that we possess, certainly this statement seems to be true of the liver. There are many lesions that cannot be considered cirrhosis, that are not typical of acute yellow atrophy, that are not due to syphilis, and yet that are associated with necrobiosis, regeneration, and at times eventual scarring. Some of these lesions cause physiologic impairment of the liver, as determined by function tests, and others do not. In many instances there has been too little correlation between the function tests. This statement has been particularly true in cases of clinically early liver damage, before the appearance of jaundice, profound asthenia, or prostration.

In all of our cases where hepatic disease was eventually proved to be present, morphologic evidence of the disease has been found upon biopsy studies. Cytologic study of the liver therefore not only becomes important in rounding out our information about this organ, but may be an aid in the diagnosis of early lesions before certain of the function tests show alteration, and at a stage in which therapy may be effective.

The method of obtaining biopsy specimens that we are suggesting has the disadvantage that frequent repetition is undesirable, although we have found that multiple biopsies a week or two apart are feasible. It has the advantage, however, of giving a considerable amount of information—more than may be obtained so safely with any other method. If this information can be correlated with tests of physiologic function of the liver and the clinical and laboratory findings, much will be learned. An understanding of early changes in the liver becomes possible.

In this presentation we have selected a few characteristic cases from approximately 50 in which such studies have been made. They illustrate among other things the true diagnostic value of the procedure in differentiating primary cancer from cirrhosis of the liver, or cirrhosis complicated by cancer. Other instances could be cited in which metastatic carcinoma to the liver arising from silent foci in the gastrointestinal tract, and not apparent with the usual methods of examination, was recognized.

### *Conclusions*

By the use of a small incision, approximately 5 cm. long, made over the liver edge under local anesthesia, it is possible to examine with a fair degree of thoroughness many of the viscera in the upper right quadrant. Visualization of a considerable portion of the right lobe of the liver is possible, as is the removal of one or more areas for microscopic examination. Out of approximately 50 cases in which this method of examination has been used, 6 are described in detail, and the microscopic findings are correlated with the clinical picture and physiologic tests of liver function.

This method of obtaining biopsy specimens has proved to be safe, simple, and effective in adding to our knowledge of the condition that exists in the liver, particularly in early derangements due to damage from nutritional and toxic disorders, inflammation, and tumors.

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## THE BRONCHIAL ARTERY IN PULMONARY INFARCTION

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Perhaps because of its inaccessibility and deceptively small size, the importance of the bronchial artery has not been generally appreciated. Calling it the nutrient supply to the lung is an understatement, for the integrity of all the pulmonary structures depends on flow in this obscure vessel. Yet, with one exception, the pathologic physiology of diseases has never been definitely connected with defective bronchial artery flow(1). The exception, formulated by Virchow on the basis of autopsy material and an experiment(2), links bronchial artery enlargement with embolism and restrictions of pulmonary flow. Since the affected parenchyma did not undergo ischemic necrosis, he inferred that bronchial artery flow was responsible for preventing breakdown of the infarct, and so began a still unsettled controversy.

The object of this paper, after a review of the meager literature on the bronchial artery in infarction, is to analyze the hemodynamics of the early stages of an infarct in the light of recent data on bronchial artery flow. Bronchial artery enlargement in congenital pulmonary artery anomalies is

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1. De Burgh Daly, I.: Interference of Intrinsic Pulmonary Mechanisms as a Potential Cause of Asthma, Tr. Med.-Chir. Soc. Edinburgh 115:139-144, 1935-36; In Edinburgh M. J. (Sept.) 1936.
2. Virchow, R.: Gesammelte Abhandlungen zur wissenschaftlichen Medizin, Exp. XX, pp. 285, 294, 295. Frankfurt a. M., 1856.

excluded(3); vascular growth in the non-functioning lung *in utero* scarcely duplicates the vascular emergency of embolism. There is no need to dwell on the frequency of infarcts and the number which, giving few or no clinical signs, apparently heal without scarring(4).

### *Collateral Circulation in Pulmonary Infarction*

A preliminary question to be considered is whether pulmonary artery collateral connections could support the area of infarction if the bronchial arteries were ligated. The available evidence indicates that they could *not*. First, many pulmonary infarcts proceed to necrosis despite the combination of bronchial artery flow and whatever pulmonary collateral circulation there may be(5). Secondly, injection experiments on embolized lungs(6) show that the pressure of injection is the factor determining flow through the pulmonary collaterals, but that even high pressures do not give complete injection of the affected sector. With a suspension which will not pass capillaries, the sector remains uninjected. Clearly, the collaterals are of capillary size.

From the theoretical standpoint it may be predicted that pressure in the pulmonary arteries is too low to force blood through long sections of resistant capillary channels, particularly when pulmonary vein *ostia* of low resistance are so readily available. An early infarct does contain blood, but this could enter the infarcts as readily by retrograde flow from the veins as from the capillaries. It has been claimed that ligation of the bronchial artery made no difference in the pathologic changes following experimental embolism in dogs(7), but the validity of this experiment is doubtful; even if the ligature had chanced to include the main bronchial artery, the extrapulmonary collateral connections in the dog are so rich as to provide nearly normal blood flow(8).

### *Histologic Studies*

Virchow's thesis stimulated search by histologic methods for possible anastomoses between bronchial and pulmonary systems, as new channels would hardly develop where connections already existed. Injections of either or both sets of vessels clearly showed that communications were present, but the details and areas were disputed for a number of years(3,6b,7,9). Despite the innate deficiencies and highly abnormal hydraulics of the injection technique, such data were variously interpreted as proving or disproving that bronchial blood reaches the alveolar capillaries in quantities sufficient for the needs of the lung.

Miller's views of the vascular interrelations(9a) are shown schematically in figure 1. His careful reconstructions have been confirmed by radiographic and perfusion studies and injections into the living animal(6a,8,9b,10). Bronchial artery flow enters the pulmonary system at two points: (1) the capillary bed on the respiratory bronchioles, and (2) the pulmonary veins, after perfusing its own capillary bed. In some species the visceral pleura is an additional fusion area. No true precapillary anastomoses between the two systems exist; what once were thought to be such are now recognized as *vasa vasorum* on the pulmonary artery derived from the bronchial artery(9). Bronchial flow can reach alveolar capillaries only after it has passed a capillary bed.

To summarize, histologic methods of study have proved unsuitable for evaluating the hemodynamics of the two streams. Nevertheless, such accurate data are requisite for pathologic and physiologic studies.

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3. Christeller, E.: Funktionelles und Anatomisches bei der angeborenen Verengerung und dem angebeborenen Verschluss der Lungenarterie, inbesondere ueber die arteriellen Kollateralbahnen bei diesen Zustaenden, Virchows Arch. f.path.Anat. 223:40-56, 1917.
4. Chasnoff, J.: Pulmonary Infarction, Bull. U. S. Army M. Dept. 6:125-139 (Aug.) 1946.
5. Castleman, B.: Healed Pulmonary Infarcts, Arch. Path. 30:130-142 (July) 1940.
6. (a) Mathes, M. E., Holman, E., and Reichert, F. L.: A Study of the Bronchial, Pulmonary and Lymphatic Circulations of the Lung under Various Pathologic Conditions Experimentally Produced, J. Thoracic Surg. 1:339-362 (April) 1932.
   (b) Karsner, H. T. and Ghoreveb, A. A.: Studies in Infarction: III. The Circulation in Experimental Pulmonary Embolism, J. Exper. Med. 19:507-511, 1913.
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8. Bruner, H. D. and Schmidt, C. F.: Blood Flow in the Bronchial Artery of the Anesthetized Dog, Am. J. Physiol. 148:648-666 (March) 1947.
9. (a) Miller, W. S.: The Lung, Springfield, Ill., C. C. Thomas, 1940.
   (b) Berry, J. L.: The Relation between Bronchial and Pulmonary Circulations in the Human Lung, Investigated by Radiopaque Injections, Quart. J. Exper. Physiol. 24:305-314 (Feb.) 1934.
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    (b) Berry, J. L. and de Burgh Daly, I.: The Relation Between the Pulmonary and Vascular Systems, Proc. Roy. Soc. s. B. London 109: 319-336 (Dec. 2) 1932.
    (c) De Burgh Daly, I. and von Euler, V.: The Functional Activity of the Vasomotor Nerves to the Lungs in the Dog, Proc. Roy. Soc. s. B. London 110:93-111 (Feb. 1) 1932.
    (d) Alcock, P., Berry, J. L., de Burgh Daly, I. and Narayana, B.: The Action on Perfused Lungs of Drugs Injected into the Bronchial Vascular System, Quart. J. Exper. Physiol. 26:13-27 (April) 1936.

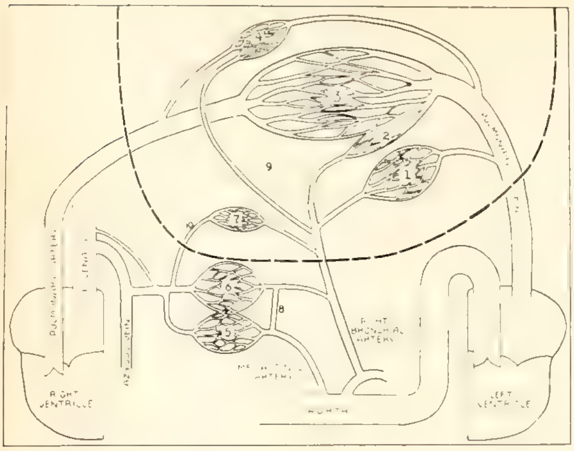

**Fig. 1. Schematic diagram of the vascular connections of the right posterior bronchial artery in the dog. The heavy dashed line separates intra- and extrapulmonic portions. 1: Capillary bed of the general intrapulmonic flow. 2: Capillary bed on respiratory bronchioles showing fusion with 3: alveolar capillary bed supplied by the pulmonary artery. 4: Visceral pleural capillaries supplied by either or both systems; drainage in either case as shown. 5: Capillary bed of a mediastinal artery fusing with 6: capillary bed of extrapulmonic branches of the bronchial artery. 7: Capillary bed of intrapulmonic bronchial artery branches proximal to the first two or three dichotomies and in the perihilar pleura. 8: Collateral arterial channels. 9: Vasa vasorum on pulmonary arteries derived from the bronchial arteries; these were once claimed to be collateral connections. 10: True bronchial veins. —Reprinted from the American Journal of Physiology (8).**

### *Pathologic Studies*

Virchow's original observations have been confirmed in autopsy material(3), and, more important, experimentally(6a). Injection of radiopaque material into the bronchial arteries of animals with experimentally infarcted lobes showed that: (1) Enlargement of the artery was true hypertrophy, not vasodilatation, and occurred within two to four days following embolism; (2) enlargement was restricted to the infarcted lobes, and hence was an effect of local conditions; (3) while inflammatory reactions to bacteria hastened and perhaps exaggerated the hypertrophy, it was basically independent of inflammation; (4) injected radiopaque material seemed to diffuse into the inflammatory region surrounding a *septic* embolus, whereas when the embolism remained *sterile* the enlarged bronchial artery filled cleanly throughout the infarct. The haziness surrounding septic emboli was interpreted as newly developed precapillary connections between the two systems, but it might also signify increased capillarity or capillary permeability.

From experiments following embolism or ligation of the pulmonary vessels, three observations are noteworthy(7,10a,11): (1) Intense congestion and rapid deterioration of the lung followed restriction of pulmonary vein drainage, even though the pulmonary artery was also ligated; this finding parallels clinical knowledge that cardiac disease is likely to be complicated by necrotic pulmonary infarction. (2) The congestion following ligation of the pulmonary artery in normally breathing animals was absent during positive intratracheal ventilation. (3) Plugging of a main bronchus at the time of embolism resulted in inflammatory changes, followed by gangrene; these changes were absent when embolism of the pulmonary artery had occurred a month previously, and the bronchial artery had become hypertrophied.

To summarize, the pathologic studies have emphasized the importance of the bronchial artery and pulmonary vein in infarction, while minimizing that of the pulmonary artery. Infection and atelectasis are important factors in determining the outcome of the infarct. The pathologic literature shows a serious lack of data giving the percentage of infarcts which heal without residua, in contrast to those ending in necrosis. Neither have data been found showing that bronchial enlargement is always associated with healing of the infarct, while failure to enlarge is correlated with necrosis.

### *Physiologic Studies*

Only two studies of the bronchial circulation by physiologic techniques have been reported. One employed simultaneous perfusion of the bronchial and pulmonary circulations of excised lungs(10b,c,d), and the other, direct flow measurements in the anesthetized dog(8). Using the response to bronchoconstrictor and dilator drugs as an indicator of perfusion, the former experiments showed that, when the two systems were perfused at normal pressures, bronchial artery blood perfused the bronchioles to the exclusion of the pulmonary system. Changes of pressure and flow in the bronchial circulation generally caused pulmonary artery pressure to vary

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11. (a) Kuettner: Beitrag zur Kenntnis der Kreislaufs Verhaeltnisse der Saugethierlung, Virchows Arch. f. path. Anat. 73:476-523, 1878.
    (b) Underhill, S. W. F.: An Investigation into the Circulation through the Lungs, Brit. M. J. 2:779-782 (Nov. 12) 1921.

in the same direction, but sometimes the reverse or no effect was seen. Conversely, changes in the pulmonary artery pressure were without noticeable effect on bronchial pressure, although bronchial venous drainage shifted chiefly to the true bronchial veins when pulmonary artery pressure rose. Despite a lack of details, these experiments indicate that the pressures in the two systems are the foundation for the hemodynamic interrelations.

The direct flow measurements(8) were carried out in dogs, using the main right bronchial artery. The flow in this artery averaged 4.8 cc. per minute (range 1.0 to 26.7 cc per minute), which, corrected for extrapulmonary flow and computed for both lungs, came to 6.1 cc. per minute for the mean total bronchial flow draining into the pulmonary veins. Calculated in terms of simultaneous cardiac output (pulmonary artery flow), the total intrapulmonary bronchial artery flow averaged 0.3 cc. per 100 cc. of cardiac output; the maximal flow observed was 1.02 cc. per 100 cc. of cardiac output. Thus, on the average, some three hundred times as much blood circulates through a sector of lung by way of the pulmonary artery as by way of the bronchial artery; even when the bronchial artery flow was at its peak, the blood flow in the pulmonary artery was about one hundred times as much. At first glance this finding would seem to deny the possibility that bronchial flow might substitute even in part for pulmonary flow, but it is important that the bronchial flow was labile and influenced more by physiologic conditions than by anatomic measurements; furthermore, these measurements were not made in the hypertrophied artery.

### *Pathologic Physiology of Pulmonary Infarction*

Let us now synthesize these data into a picture of what may happen after embolism of a large intralobar branch of the pulmonary artery. In view of the shortcomings of the data, theory bordering sometimes on speculation has been employed(12).

Distal to the embolus, arterial and capillary pressures become nearly equal to pulmonary vein pressure; the latter shows a respiratory fluctuation superimposed on the general pressure level, which is determined by left atrial pressure, and by resistance to the flow of blood entering proximal to the embolus. Blood tends to enter the infarct by three routes: (1) *The alveolar capillary network from collateral pulmonary artery radicles.* As previously stated, the high flow resistance and low pressure discounts this source; the pressure does not rise unless a lobe or more is infarcted(13). (2) *The bronchial arteries.* A fraction of the flow proceeds past the embolus to the capillaries on the bronchioles which mesh with the alveolar capillaries; the latter, now that opposing pressure is minimal, are more deeply penetrated by bronchial flow. The other portion of bronchial blood passes directly into the pulmonary veins, and regardless of whether it increases venous pressure, it creates movement of venous blood toward the heart. If the bronchial arteries carry more blood than usual, as is suggested by the steeper pressure gradient and possibly by local vasodilatation, vascular hypertrophy would be expected. (3) *The pulmonary veins.* The alveolar capillaries, responding to the alternating respiratory pressures(14), may extrude and receive blood from the pulmonary veins which function as a reservoir; this pool of blood is not stagnant (see below). Of these three sources, the bronchial artery provides the only positive flow into the infarct. The "white infarct" found at autopsy falsely suggests an absence of blood.

Assuming that blood does enter the infarct, the next question is whether the volume of flow is large enough to maintain the lung tissues not normally supplied by the bronchial artery. Ordinarily one's estimate would be based on the adequacy of exchange of oxygen and carbon dioxide, but in the lung, so long as air moves in and out, alveolar gaseous metabolism is independent of blood supply. Therefore, the lung's *non-gaseous* metabolic requirements are determinative. These, to judge by the low rate of oxidation found in excised lung tissue(15), might easily be met by a restricted flow or by any other means of keeping the local metabolite concentration within reasonably physiologic limits. A joint effect of the pulmonary vein reservoir, the bronchial flow, and the res-

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12. In so doing we recall Dr. Manning's favorite advice: "Light a candle; don't ignore the darkness."

13. Gibbon, J. H., Jr., Gibbon, M. H. and Kraul, C. W.: Experimental Pulmonary Edema Following Lobectomy and Blood Transfusion, J. Thoracic Surg. 12:60-77 (Oct.) 1942.

14. Macklin, C. C.: Evidences of Increased Capacity of the Pulmonary Arteries and Veins of Dogs, Cats and Rabbits, during Inflation of Freshly Excised Lung, Rev. canad. biol. 5:199-232, 1946.

15. Stadie, W. C.: Personal communications, 1944, 1947.

piratory variations may make it possible for the small flow of fresh blood to perfuse the infarct out of proportion to its actual mass. In a manner analogous to the way in which a fresh-water stream forms an estuarial zone of intermediate salinity with the ocean, the ebb and flow of blood from the capillaries may extend to the veins. When this "dead space" blood is mixed with fresh bronchial blood, an intermediate metabolite concentration is obtained, and simultaneously some of it is discharged toward the heart.

Thus the bronchial artery dominates the mechanisms apparently responsible for meeting the metabolic needs of the infarct. The presumed small volume of flow in the artery need not deny its importance in infarction, so long as unusual demands—for example, gaseous exchange—are not made of it. The fact that not all pulmonary infarcts end in necrosis indicates that the total blood supply into the area *can* be adequate. Subsequent increase of the bronchial fraction, as evidenced by hypertrophy of the bronchial artery, probably improves blood supply to the optimal rather than the adequate level.

The obverse question is equally important: Why do certain pulmonary infarcts proceed to necrosis? Several self-evident factors are listed; their effects appear self-propagating. (1) Anatomic deficiency of the vascular set-up may limit the above sources of blood. (2) Obstruction of the bronchi causes the oxygen requirements to be thrown on the blood flow; experimental data demonstrate that embolism sets up bronchoconstrictor and secretory reflexes which obstruct the airway(16). (3) Pulmonary congestion from mitral lesions or decompensation may retard blood flow both into and out of the infarct; acute deterioration of the lung, however, is likely to follow any pre-existing depressed status. (4) Bacterial contamination of embolic or hematogenous origin, by giving rise to toxins or "spreading" factors, would disrupt the continuity of the vascular bed; local edema compressing neighboring vessels, direct endothelial damage, and induction of blood coagulation lead to the same effect. The central physiologic lesion in all these conditions is tissue anoxia, followed by nuclear degeneration, cellular dissolution, leukocyctic invasion, and repair by scar tissue(5).

Obviously definite answers to the questions raised are not warranted. As an opinion, however, it is probable that the bronchial circulation is the chief reason why many pulmonary infarcts do not undergo ischemic necrosis.

### *Summary*

Recent data on bronchial artery flow are considered in relation to Virchow's claim that it is responsible for the survival of infarcted pulmonary tissue. An analysis of the probable hemodynamic and metabolic status of the uncomplicated pulmonary infarct indicates that the flow, while small, is not inconsistent with this theory.

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# CONGENITAL CYSTS OF THE LUNG

## *Report of Two Cases*

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Congenital or acquired cysts of the lung are not common, and for that reason are often mistaken for other conditions. Congenital pulmonary cysts may cause symptoms shortly after birth, in childhood, or in adult life. They may be discovered unexpectedly, on roentgen examination or at autopsy. When pulmonary cysts are confused with other pulmonary lesions, improper management results in prolonged disability and invalidism.

The purpose of this paper is to report 2 cases of infected pulmonary cysts which illustrate the diagnostic difficulties and the therapeutic problems presented by such cysts after they become infected.

### *Case 1*

An 11-year-old girl from Alabama was admitted to Biltmore Hospital on June 17, 1938, with a chief complaint of cough and expectoration of foul sputum.

Her present illness began December 26, 1934 (when she was 7 years of age), with a respiratory infection which was diagnosed as influenza and pleurisy. A few days later her physician detected physical signs of a pleural effusion in the left side of her chest. He referred her to a surgeon, who aspirated this side of her chest, and obtained a thin, pinkish fluid.

A thoracotomy by rib resection was done; tube drainage was maintained for ten weeks, and was then discontinued in April, 1935. The wound healed,

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16. Jesser, J. H. and de Takats, G.: The Bronchial Factor in Pulmonary Embolism, Surgery 12:541-552 (Oct) 1942.

Read before the Section on General Surgery, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

*Surgeon to the Biltmore, St. Joseph's, and Asheville Mission Hospitals, and to the Western North Carolina Sanatorium; senior consultant, Veterans Hospital, Oteen; University of North Carolina Medical School, 1916.

and she remained well except for a hacking cough, which was thought to be due to diseased tonsils. A tonsillectomy was done in 1936, but the cough continued. In March and April, 1938, she ran a low-grade fever, and her mother noticed that her breath had a foul odor. On April 10, 1938, she suddenly spat up a large quantity of foul pus, and had continued to do so. About this time, her mother first noticed clubbing of the fingers. She had had no illness except measles prior to the onset of her present illness.

Physical examination revealed a well developed girl of 11, who did not appear very ill. The fingers and toes showed moderate clubbing. There was diminished expansion of the lower half of the left side of the chest. The percussion note was flat below the eighth rib anteriorly and the fifth thoracic vertebra posteriorly. Over this area the breath sounds were absent, and the voice sounds were not transmitted. The scar of the former thoracotomy was present. The hemoglobin was 68 per cent, the erythrocyte count 3,650,000, and the leukocyte count 11,200. The posterior-anterior and lateral roentgenograms (fig. 1 and 2) showed a rounded cavity in the base of the left side of the chest, containing air and fluid. Examination of her sputum revealed fusospirochetes and many mixed organisms, but no tubercle bacilli. A diagnosis of a chronic empyema with a broncho-pleural fistula was made by me.

On June 30, 1938, a thoracotomy was done by resecting a portion of the tenth rib in the scapular line. When the parietal pleura was incised, no free pleural space was encountered, and no empyema was found, although pus had been obtained by aspiration at this site. Pus was again aspirated, and the thin wall of what appeared to be a pulmonary abscess was incised. A considerable amount of putrid pus was aspirated. In my operative notes, I stated that the wall of the abscess was smooth, glistening, and red. No necrotic tissue and no trabeculations were seen. This appearance is not typical of a pulmonary abscess, and made me believe that this was an infected cyst of the lung, which would subsequently require lobectomy. A portion of the wall of the cyst was removed for examination. The pathologist did not recognize the true nature of the lesion.

The patient had a very stormy convalescence. A high fever developed, and she was extremely ill. A roentgenogram revealed a density in the left upper part of the chest, which was proved to be a mesial empyema. This was drained by a closed thoracotomy in the fifth interspace posteriorly on July 26. The pus removed was putrid and contained fusospirochetes and mixed organisms. After this procedure the girl gradually improved, and was discharged from the hospital on August 18, 1938. Continuous drainage of the infected cyst was maintained by means of a rubber tube.

The patient remained well, attended school the next year, and returned to Biltmore Hospital on June 2, 1939. Roentgenograms showed the same rounded cavity at the left base without a fluid level.

On June 3, 1939, the left phrenic nerve was crushed under local anesthesia. On June 5, under intratracheal cyclopropane and ether anesthesia, a lobectomy of the left lower lobe was attempted. The lobe was found to be densely adherent; it was freed with difficulty and with considerable loss of blood. By the time the lobe was separated from the diaphragm and the chest wall, the patient began to show signs of shock. Bleeding vessels were ligated; a gauze pack was inserted, and the wound partly closed. She rallied quickly after a transfusion of whole blood.

On June 19, under intratrachael cyclopropane and ether anesthesia, the lobectomy was completed.

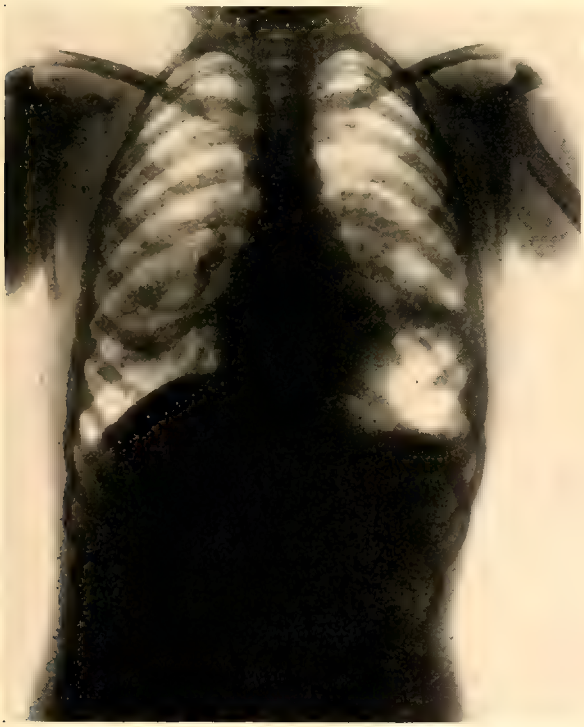

Fig. 1. (Case 1) Posterior-anterior roentgenogram, showing a large cavity in the left lower thorax, with a fluid level.

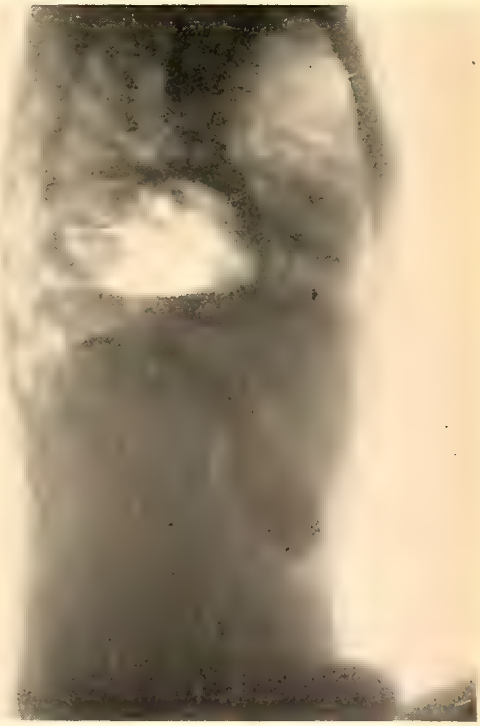

Fig. 2. (Case 1) Lateral roentgenogram, showing the same cavity occupying the space of the left lower lobe. Notice the absence of inflammatory zone around the cavity.

Again difficulty was encountered in dissecting the lobe free from the mediastinum and upper lobe. The dissection was accomplished without the loss of too much blood, and the lobe was removed by the tourniquet technique. Since blood continued to ooze, the pleural cavity was packed with gauze, and the wound partly closed. The patient showed signs of mild shock, but this was controlled with a blood transfusion.

The pathologist's report was as follows: "The mass of lung tissue measures 3 by 6 inches, and contained a smooth wall cavity occupying almost the entire area, leaving a shell of collapsed lung tissue from 0.5 to 1 cm. in diameter. Microscopically the lining of the cyst wall is made up of a layer of granulation tissue, in which numerous polymorphonuclear leukocytes, lymphocytes, and plasma cells are seen. There is no epithelial lining to be seen. Throughout the wall of the cyst one sees collapsed bronchioles with peribronchial fibrosis and lymphocytic infiltration. Collapsed alveoli are seen in which there are many desquamated endothelial cells and pigmented monocytes. There is no evidence of tuberculosis or malignancy."

Her recovery was rapid. The gauze pack was gradually removed, and on June 23 a rubber drainage tube was inserted. On July 3 she was discharged from the hospital; and on September 3, 1939, the drainage tube was removed, as the pleural cavity was obliterated. This patient is now a grown young lady attending college.

### *Comment*

This patient, I believe, had a true congenital cyst of the left lower lobe, which became infected at the age of 7, and which was erroneously diagnosed and treated as empyema. It subsequently became reinfected, and was mistaken for a chronic empyema, with a broncho-pleural fistula. Yet the roentgenograms (fig. 1 and 2) are characteristic of a cyst. Note that the cavity is round. There is no inflammatory zone around the cavity, as you would see in pulmonary abscess or in tuberculosis. Note that the pleura is not thickened, as would be the case in chronic empyema. At the time of my first operation, the true nature of the condition was recognized, and the cyst was drained. After the patient had recovered from the infection, lobectomy was successfully performed.

### *Case 2*

A 20-year-old woman was admitted to Biltmore Hospital on July 24, 1946.

At the age of 10 this girl had pneumonia and pleurisy on the right side. Since then she had frequently had pleuritic pain in the right upper part of her chest. During the winters she had repeated episodes, consisting of pain in the right side of the chest, fever, and a non-productive cough. During the winter before admission she had a respiratory infection, diagnosed as influenza. It was accompanied with right-sided pleuritic pains and a non-productive cough. Since this episode, she had been listless and had fatigued easily. About July 1, 1946, pain developed in the right shoulder and right side of the chest. She was treated with diathermy, but did not improve.

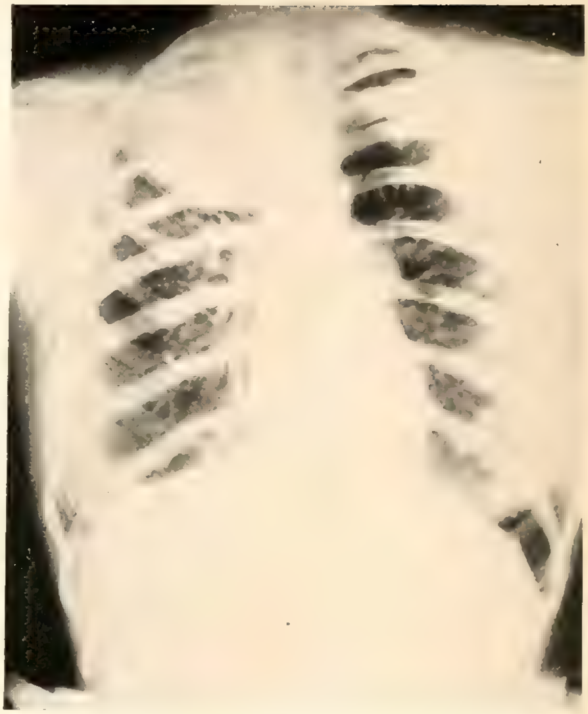

**Fig. 3. (Case 2) Posterior-anterior roentgenogram, showing a heavy density in the right apex with a clear-cut border.**

A roentgenogram (fig. 3) was made, and interpreted as showing an atypical pneumonia. She was admitted to the hospital and treated with sulfadiazine and penicillin. A week later there was no change in the roentgenogram. At the onset, there was a small amount of rusty sputum. On the evening of July 25, 1946, while I was examining her, she began to cough severely and expectorated several ounces of thick, purulent sputum, which did not have a foul odor. After that, she continued to cough, and raised 60 cc. of sputum daily.

On admission, her temperature was 99 F., pulse 80, respiration 16. Physical examination revealed a well developed young woman, who did not appear to be very ill. The examination was entirely normal except over the upper lobe of the right lung, where there was dullness to percussion, absent breath sounds, and transmitted voice sounds.

Her hemoglobin was 88 per cent, the erythrocyte count 5,000,000, the leukocyte count 17,400. The differential count showed 59 per cent neutrophils, 4 per cent eosinophils, 35 per cent lymphocytes, and 2 per cent mononuclears.

Examination of the sputum revealed pneumococci and staphylococci. Repeated examinations were negative for tubercle bacilli. A tuberculin test, 1:1000, gave a 1 plus reaction.

The patient began to have fever ranging from 99 to 103 F. Under penicillin therapy it subsided in eight days. A bronchoscopic examination on August 5 yielded no information except that pus escaped from the right upper lobe bronchus.

Roentgenograms made on July 26 (fig. 4 and 5) revealed the true nature of the lesion. The density in the right upper part of the chest had disappeared, revealing a thin-walled cavity without a surrounding inflammatory zone. A diagnosis of an infected congenital cyst was made. As soon as the infection had been controlled, primary lobectomy was elected as the treatment of choice.

On August 8, 1946, under intratracheal cyclopropane and ether anesthesia, the right upper lobe was

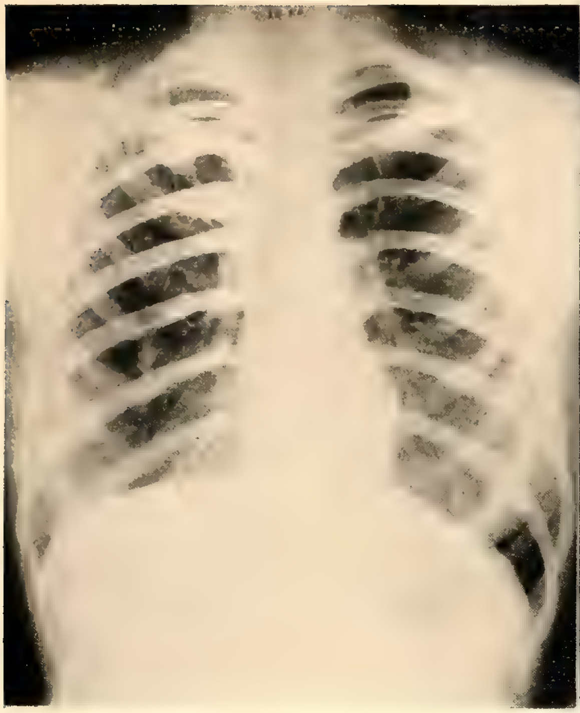

Fig. 4. (Case 2) Posterior-anterior roentgenogram, showing a large cavity containing a small amount of fluid at the right apex.

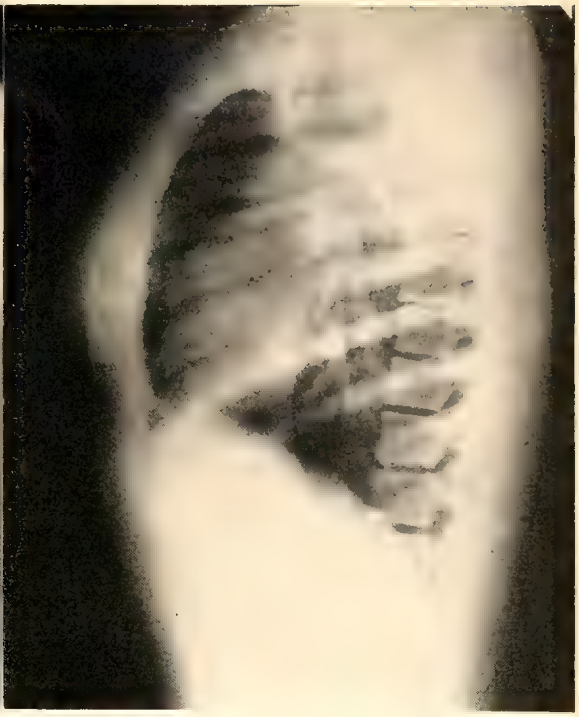

Fig. 5. (Case 2) A lateral roentgenogram which shows a large oval cavity in the right upper lobe containing air and a small amount of fluid

In figures 4 and 5 note the absence of thickened pleura and of a zone of inflammatory reaction around the cavity.

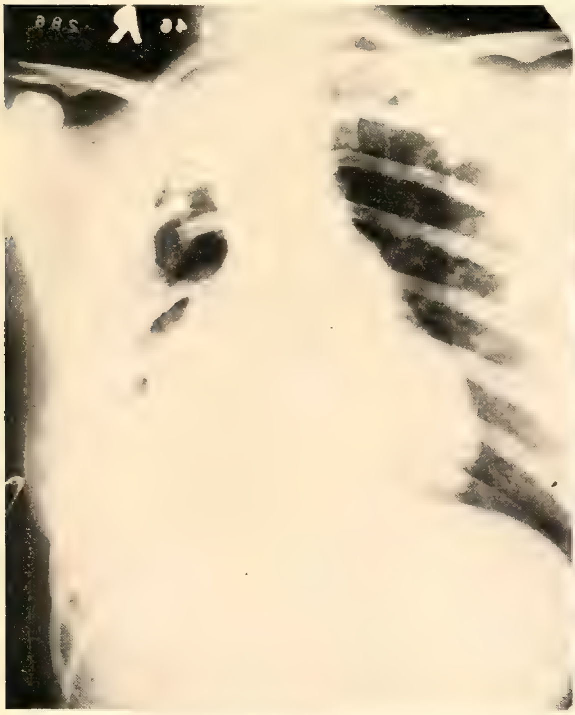

Fig. 6. (Case 2) Posterior-anterior roentgenogram which shows the right lower and middle lobes collapsed, the chest wall contracted, and the parietal and visceral pleura to be very much thickened.

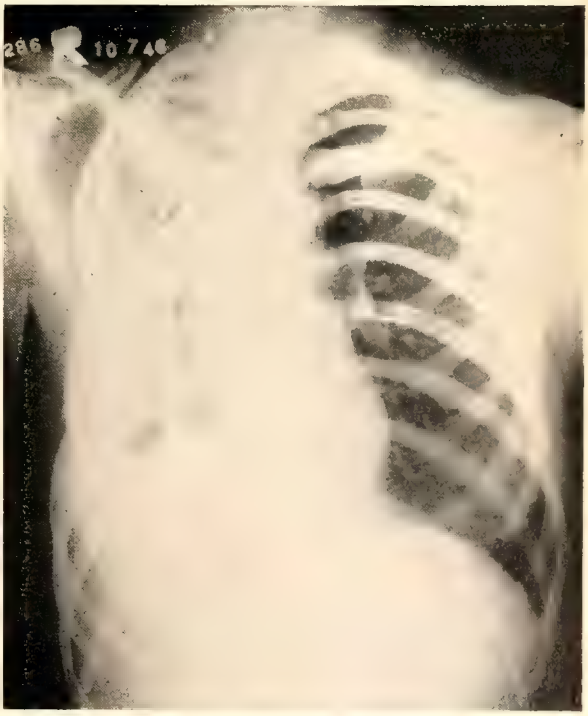

Fig. 7. (Case 2) Posterior-anterior roentgenogram which shows the lower and middle lobes re-expanded and a small empyema space in the apex, with the drainage tube in situ.

removed by the individual ligation technique. Five hundred cubic centimeters of blood was given by transfusion during the operation. She stood the operative procedure well.

The pathologist's report was as follows:

"The specimen consists of lung tissue which measures 12 by 8 by 5 cm. and contains a cavity 5 cm. in diameter. This cavity has formed a globular mass, the wall of which on one side is thin and on the other side is thick, and consists of lung tissue containing very little air. The lining of the cavity is grayish brown and relatively smooth.

"Microscopically, the wall of the cavity shows a lining of respiratory epithelium, which is interrupted in a few places. The wall is composed of dense, fibrous tissue, with rather extensive infiltration of chronic inflammatory cells, especially under the epithelium. Immediate adjacent lung tissue is more or less fibrosed and infiltrated with chronic inflammatory cells. There are areas that are typical of old, organized pneumonia. Immediately adjacent to the cavity are several compressed bronchioles. Many bronchioles contain an exudate of inflammatory cells. There are occasional areas of necrosis, but nothing suggesting tuberculosis.

"Diagnosis: Infected cyst of the lung."

Her convalescence was smooth until August 21, when her temperature reached 103 F. Some serosanguineous fluid was aspirated on several occasions, and was negative on culture. After each aspiration, 50,000 units of penicillin was instilled into the chest cavity. She continued to run fever, however; and in spite of the negative cultures and a low leukocyte count, I felt that she had empyema.

On August 29, a thoracotomy by rib resection was done. Two rubber tubes were inserted, a small one for irrigation and a larger one for drainage. The patient's temperature immediately came to normal, and she did very well except that she complained of considerable pain in the right side of the chest. The lower lobe showed no evidence of re-expansion. Repeated roentgenograms (fig. 6) showed that the pleura was becoming thicker, and that the right chest was contracted. This girl now had chronic empyema, and was well on the way to becoming a pulmonary cripple.

On September 19, under intratracheal cyclopropane and ether anesthesia, the original incision was reopened, and a complete decortication of the parietal and visceral pleura was done. Immediately the lower and middle lobes expanded, as the anesthetist applied positive pressure. A Pezzar catheter was inserted in the sinus of the thoracotomy wound and a no. 14 catheter into the first interspace in the midclavicular line. The operative wound was closed tightly. Within five days the lower catheter was blocked by the re-expanded lower lobe, and was removed.

Recovery from this operation was not as rapid as expected. The patient had several episodes of fever, but gradually improved, and was discharged from the hospital on October 31, 1946. Fig. 7 shows that the lower lobe has re-expanded to fill nearly the whole chest, there being a small pocket at the apex which has not closed.

*Comment*

This patient had a typical cyst, filled with fluid, which evacuated itself. Before the cyst evacuated itself, the x-ray appearance suggested a tumor. Afterwards it showed the characteristic picture of a cyst containing air. The cyst was rounded, the wall was thin, and there was no inflammatory zone around it.

In this patient, the proper treatment was carried out. Unfortunately empyema developed as a postoperative complication, and only an early decortication of the lung saved the patient from being a pulmonary cripple.

## Maternal Welfare Section*

### ABORTIONS AND THEIR MANAGEMENT

Abortion is defined as the termination of pregnancy prior to the twenty-eighth week or the time of viability of the fetus. Abortions are usually further subdivided into those which occur before the sixteenth week of pregnancy and those from the sixteenth to the twenty-eighth week. The greatest problem presented to the Committee on Maternal Welfare has been in the complications resulting from *early* abortions. After a pregnancy has reached four and a half months, the labor of the patient is considered with the same respect by the patient and the physician as a term pregnancy, and adequate care is usually arranged for the delivery.

The laity have little appreciation of the danger associated with spontaneous or instrumental termination of pregnancy in the early months. The records of the Maternal Welfare Committee contain twenty-four deaths which have resulted from complications of early abortions. Four of these resulted from the ingestion or injection of toxic drugs in an attempt to produce abortion. Nine were due to hemorrhage and eleven to infection following the termination of pregnancy. Three of the patients lost their lives after an attempt was made to interrupt pregnancy on a therapeutic basis.

A review of these records shows that practically all of the deaths were preventable and that ignorance or neglect on the part of the patient or her family was often responsible for the death. This factor was common in cases where criminal abortion was performed and the patient concealed her illness until it was too late for anything to be done. However, gross errors in judgment and tech-

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*Prepared for the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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nique of the management of the patient are found in the records, which show the need for standard practices in the handling of the various problems presented.

### *Etiology*

The etiology of traumatic or instrumental abortions is obvious, and the only problem is whether the procedure was carried out under criminal circumstances in an undesirable environment or whether asepsis was observed in a hospital.

The etiology of spontaneous abortion is a moot question, and numerous theories have been advanced. The most clearly established etiologic factor is that so carefully studied by Streeter(1) and Hertig(2), who have shown fetal abnormalities due to defective germ plasm or improper implantation of the ovum in approximately 40 per cent of all aborted products of conception. Imperfect implantation results in deficient nutrition and development of the embryo, with fetal death. The other various textbook theories of the etiology are held in considerable doubt by many observers. That endocrine deficiency may cause spontaneous abortion is probable, but the presence of such deficiency should be established for each patient concerned, if that is possible. Congenital uterine anomalies and uterine hypoplasia are probably much less significant than is suggested by the texts. Maternal disease, including renal lesions and syphilis, often cause abortions to occur.

### *Classification*

Abortions are classified in a number of different ways. The etiology and the presence or absence of infection have a great influence on the prognosis and method of management. The following classification is complete:

| Time | Etiology | Clinical Condition | |
|---|---|---|---|
| **Early** | **Spontaneous** | **Threatened** | |
| | | **Inevitable** | **Septic*** |
| **Late** | **Induced** | **Incomplete** | |
| | **a. Therapeutic** | **Complete** | **Non-septic** |
| | **b. Criminal** | **Missed** | |

*All abortions are potentially infected.

A careful history and physical examination are essential to an accurate classification of the lesion present. Accurate diagnosis must be made if serious errors in the management of the case are to be avoided. The patient's history should be carefully taken and an accurate estimate of the duration of pregnancy obtained. The presence or absence of fever and an estimate of the total amount of blood lost by the patient should be carefully considered in the decision as to how the problem should be managed. We must keep in mind that ectopic gestation and tubal rupture or abortion are common lesions which often result in the patient's death if an error in diagnosis is made. A careful, sterile pelvic examination is indicated in each case, and a presumptive diagnosis without examination is acceptable only if a careful examination has been made a few days before the onset of typical symptoms of a threatened abortion.

### *Diagnosis*

The diagnosis of *threatened abortion* is justified when slight bleeding and lower abdominal cramps occur in the early weeks of pregnancy. A pelvic examination which confirms the presence of intrauterine pregnancy and the origin of the bleeding from the uterine cavity, with the escape of blood from the cervical canal, is essential to confirm the diagnosis. The adnexa must be carefully palpated to rule out the presence of tubal ectopic gestation. A diagnosis of *habitual abortion* is justified only if three spontaneous abortions are known to have occurred.

The presence of free bleeding, dilatation of the cervix to 2 cm. or more, or rupture of the amniotic sac which is confirmed justifies the diagnosis of *inevitable abortion.* An *incomplete abortion* is present if a clear history of passing parts of the products of conception—usually the fetus—is obtained, if bleeding continues, and if the uterus is enlarged by the retained placental tissue. Bleeding stops when an abortion is complete, and the uterus returns to near normal size.

A *missed abortion* is present when there is conclusive evidence that the fetus has been dead for sixty days. This diagnosis is justified when careful palpation and exact measurement show no growth of the uterus, and when the Friedman test is negative.

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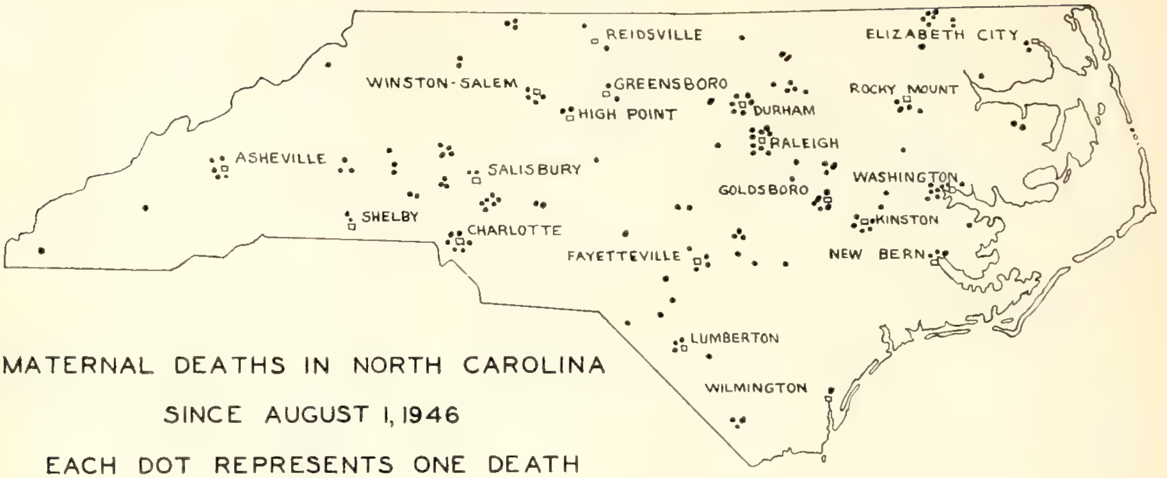
1. Streeter, George L.: Focal Deficiencies in Fetal Tissues and Their Relation to Intrauterine Amputation, Carnegie Inst. of Washington, 22:1-44, 1930.
2. Hertig, A. T. and Livingstone, R. G.: Spontaneous, Threatened and Habitual Abortion: Their Pathogenesis and Treatment, New England J. Med. 230:797-806 (June 29) 1944.



MATERNAL DEATHS IN NORTH CAROLINA

SINCE AUGUST 1, 1946

EACH DOT REPRESENTS ONE DEATH

### *Treatment*

#### *Threatened abortion*

The various forms of treatment recommended by numerous investigators of the problem of threatened abortion have obtained approximately the same results. It is apparent from the available publications that selection of the patient has had more influence upon the ultimate results than the method of treatment. The lay public is now educated to seek therapy for threatened abortion, and most such patients demand an active program of treatment when the wish for a child is present. The combined use of estrogen and progestin is at present the most popular method of endocrine therapy, but should not be instituted or continued over a period of time without pelvic examinations to confirm the presence of pregnancy and continued normal development of the uterus. Persistent or severe pain is strongly suggestive of ectopic gestation, and the presence of anemia or its appearance in the course of the patient's illness should always raise the question of this possibility.

#### *Habitual abortion*

Habitual abortion is primarily a problem of the specialist, and should be treated before conception takes place.

#### *Inevitable abortion*

This problem can usually be solved by the administration of oxytocic drugs. Pitocin and ergotrate preparations can be safely used in the first twelve weeks of pregnancy, and the administration of 0.5 cc. of posterior pituitary extract, repeated in thirty minutes and followed by the oral administration of six ergotrate tablets (one every four hours), usually results in the prompt spontaneous evacuation of the uterus. At times free bleeding requires the instrumental removal of the products of conception. Under these circumstances strict asepsis should be observed, and the cavity of the uterus evacuated as gently as possible, using sponge holders or similar very dull instruments. Usually the products are lying in the cervical canal and may be gently removed without invading the uterine cavity.

#### *Incomplete abortion*

Incomplete abortion should be handled in an identical manner. The presence of fever, evidence of instrumentation, or of pelvic contamination or infection is an absolute contraindication to invasion of the uterine cavity with any instrument, unless bleeding is profuse enough to endanger the patient's life. Under these circumstances the remaining contents of the uterus should be removed with as little manipulation as possible and by the gentlest possible use of the instruments.

The routine use of dilatation and curettage of the uterus is unnecessary for the majority of patients with incomplete abortion, and simply increases the danger to the group who have contamination of the pelvic tissues or latent pelvic infection. A careful general examination should precede the administration of any anesthetic agent. Marked anemia should be treated by the transfusion of an amount of whole blood sufficient to return the patient's hemoglobin to normal or near normal levels. All anesthetics are contraindicated in the presence of severe anemia, and a fatal result may follow the administration of an anesthetic agent.

*Complete abortion*

No treatment is indicated for a complete abortion, except possibly the administration of an oxytocic drug to hasten involution of the uterus and as a prophylactic measure against bleeding.

*Missed abortion*

Conservatism is indicated in the presence of a missed abortion. If the patient is reassured about her condition and told that spontaneous termination of pregnancy will occur in time, the best results will be obtained. Attempts to evacuate the uterus are associated with appreciable danger, unless every safeguard, including blood for transfusion, is available.

*Infection resulting from abortion*

Adequate chemotherapy is indicated at the first definite evidence of pelvic infection associated with an abortion. A culture of the offending organism made from the cervical canal is of unlimited value in determining the prognosis and the most suitable drug for the patient's treatment. Transfusions are urgently needed by the anemic patient, as chemotherapy may be of little avail in the presence of even moderate anemia. If sulfonamides are to be used for the treatment of a pelvic infection, the dose should be regulated by determinations of the blood level of the drug; frequent blood counts should be done; and an alkaline urine should be maintained by the administration of 8 to 12 Gm. of sodium bicarbonate daily, or larger doses if they are necessary to produce an alkaline urine. An initial dose of 4 Gm. and maintenance doses of 1 Gm. every four hours are usually necessary to produce effective blood levels of a sulfonamide. Twenty thousand units every four hours is the minimum dose of penicillin which can be expected to produce good results. Larger doses of penicillin, up to 100,000 units every four hours, are necessary at times to control a pelvic infection. The drug which is used and the dosage must be largely determined by the offending organism and the severity of the patient's infection.

*Summary*

In summary it may be stated that abortion is one of the principal causes of maternal deaths in North Carolina. A program of lay education is needed to combat the problem. Standard practices, which are outlined above, should be employed in the management of this complication of pregnancy. Early and adequate transfusions of whole blood must be given if unnecessary deaths are to be avoided.

Therapeutic abortion is a dangerous procedure which should be carefully considered and employed only after thorough general preparation of the patient. Three recent deaths offer mute condemnation of the injudicious use of this valuable medical method. The subject of therapeutic abortion will be considered separately in an early issue.

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### Army Medical Officers Find Real "Shell Shock" Cases

Real "shell shock"—a relatively rare condition—has been found by Army medical officers. It is a hitherto undescribed medical syndrome—a mental and physical condition due entirely to the effect of blast on the tissues of the brain.

In World War I, practically every neuropsychiatric case resulting from combat was labelled "shell shock" until it was discovered that many such cases had never been within miles of an exploding shell. This made the term meaningless and it was dropped altogether from medical language, although it persisted among the lay public.

Now the existence of a limited number of cases of pure shell shock—now called "closed head injury syndrome due to blast"—is established by an intensive study reported in the October issue of the **Bulletin**, official Medical Corps publication.

The main complaints of the blast group were headache, ringing in the ears, deafness and anxiety. Other symptoms included dizziness (not true vertigo), daze and confusion, sudden attacks in which everything went black, weakness, fatigue, chest pains and backache. Apathy, mental lethargy and many physical complaints were also reported.

When seen two to twelve months after injury the syndrome complex was little changed. Ringing in the ears had disappeared in some cases and deafness had improved considerably. Backaches, dizziness and blackouts still were mentioned frequently. When questioned, none of the men would acknowledge retention of even 75 per cent normal energy. A third indicated poor memory for recent events but in none was memory loss a disability. Moderate depression was noted in several.

"In the total synthesis a more concrete concept of the syndrome emerges," the report said. "The men had been stunned and often rendered unconscious by nearby blast. Two thirds of the group had been unconscious. A third showed ruptured ear drums. Anxiety tension or dullness and apathy were present in 65 per cent. Headaches were heterogeneous in character. They were usually described as a 'dull ache' or sharp jabs of pain in the scalp. About 20 per cent showed minor but definite neurological changes."

Whether there is definite alteration in the brain has been impossible to determine, the report stated. The indications are, however, that this is true. Even so, the study explains, it need not cause any permanent mental or nervous disability and on the whole the prognosis for shell shock is good.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

DURHAM

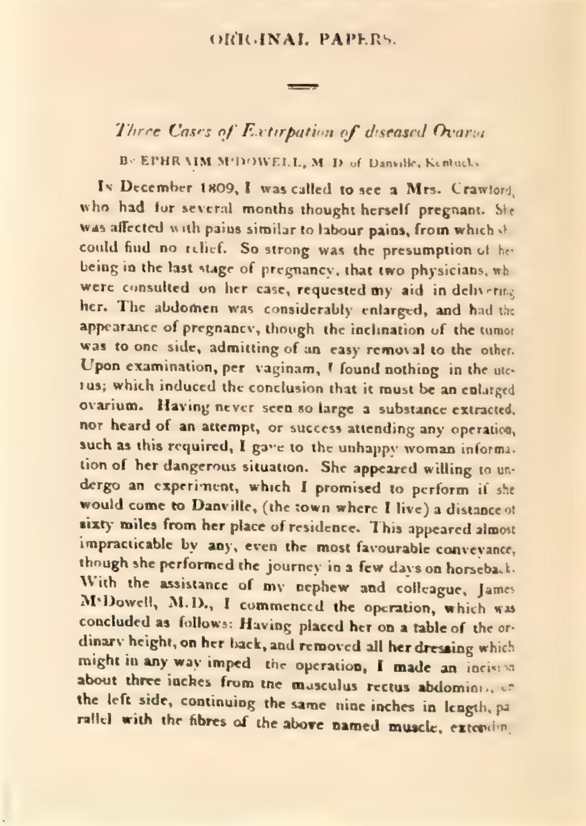
## OBSTETRICS AND GYNECOLOGY IN AMERICA

## V

## EPHRAIM McDOWELL AND OVARIOTOMY

The story of the first ovariotomy, performed in December, 1809, in Danville, Kentucky, is a familiar one to most Americans. We have read many times of the courage and endurance of Mrs. Crawford, the patient, and of the skill and daring of the surgeon, Ephraim McDowell. For twenty-five tense minutes, McDowell proceeded with an operation which he knew to be a hazardous experiment; he knew also that failure would probably result in the destruction of his professional reputation. With no precedents to guide him, with no aid from anesthesia or asepis, with none of the elaborate paraphernalia of the modern operating room, he depended solely upon his own cool judgment and his accurate knowledge of anatomy. Twenty-five days later, Mrs. Crawford returned to her home, able once more to resume her accustomed routine.

Of the many stories told about McDowell's history-making operation, those that describe an indignant mob gathered at the house at the time of the operation, those that say he performed the operation elsewhere than in his own surgery, those that represent him as seeking to be spectacular are decidedly apocryphal. At the time of this famous operation, Ephraim McDowell, Virginia-born, Kentucky-bred, and Edinburgh-trained, had been in practice about fourteen years and was a respected member of his small community. His closest friends described him as a silent, phlegmatic man. His accomplishments grew, not from a desire for recognition or acclaim, but from the ingenuity, resourcefulness, and courageous attitude developed in him by long practice under the stern conditions of the frontier. He had derived inestimable inspiration, also, from the teachings of John Bell at Edinburgh, and it is interesting to note that both Bell and McDowell were made unhappy during the latter part of their lives by the small-mindedness and jealousy of their contemporaries and colleagues.



ORIGINAL PAPERS.

*Three Cases of Extirpation of diseased Ovaria*

By EPHRAIM M'DOWELL, M. D. of Danville, Kentucky.

In December 1809, I was called to see a Mrs. Crawford, who had for several months thought herself pregnant. She was affected with pains similar to labour pains, from which she could find no relief. So strong was the presumption of her being in the last stage of pregnancy, that two physicians, who were consulted on her case, requested my aid in delivering her. The abdomen was considerably enlarged, and had the appearance of pregnancy, though the inclination of the tumor was to one side, admitting of an easy removal to the other. Upon examination, per vaginam, I found nothing in the uterus; which induced the conclusion that it must be an enlarged ovarium. Having never seen so large a substance extracted, nor heard of an attempt, or success attending any operation, such as this required, I gave to the unhappy woman information of her dangerous situation. She appeared willing to undergo an experiment, which I promised to perform if she would come to Danville, (the town where I live) a distance of sixty miles from her place of residence. This appeared almost impracticable by any, even the most favourable conveyance, though she performed the journey in a few days on horseback. With the assistance of my nephew and colleague, James M'Dowell, M.D., I commenced the operation, which was concluded as follows: Having placed her on a table of the ordinary height, on her back, and removed all her dressing which might in any way imped the operation, I made an incision about three inches from the musculus rectus abdominis, on the left side, continuing the same nine inches in length, parallel with the fibres of the above named muscle, extending

Fig. 1. The opening page of McDowell's article on his first three successful ovariotomies, as it appeared in the **Eclectic Repertory**, Philadelphia, 1817. (Reproduced through the courtesy of the Army Medical Library)

Mrs. Crawford's case was reported in 1817 in the *Eclectic Repertory* of Philadelphia (fig. 1), along with two other successful ovariotomies. The article immediately excited Dr. James Johnson of London to acid ridicule of McDowell's literary style; the Londoner also expressed total disbelief in McDowell's statement that he had found the patient engaged in making her bed on the fifth postoperative day. (The early mobilization practiced in this case by McDowell was considered new fifty years ago, when many of the greater German surgeons had their patients walk back from the operating room, and it is a recognized practice today.) We can better appreciate Dr. Johnson's incredulous reaction to the McDowell article when we realize that in those times both patient and surgeon regarded even a simple operation with terror and desperation, and that for a surgeon to enter the abdominal cavity deliberately was unheard of. The same Dr. Johnson was giving expression to the general attitude of the medical profession when he wrote in a later review of ovariotomy: "In despite of all that has been written respecting this cruel operation, we entirely disbelieve that it has ever been performed with success, nor do we think it ever will." It seems almost unbelievable that a man could bring himself to oppose the strongest convictions of his colleagues as boldly as McDowell did in resolving to attempt ovariotomy.

It would seem that great achievements in medicine, such as McDowell's ovariotomy, frequently follow a definite pattern: A desire for achievement, the courage and energy necessary to perform a daring experiment, and inspiration, usually acquired from an outstanding preceptor. McDowell's teaching had been adequate; he possessed courage and ingenuity; and he proceeded with great deliberation to perform his task. He was prevailed upon to report his first three cases, however, only by much persuasion and after a lapse of seven years. Such caution and deliberation are virtues in medicine, all too often neglected today.

McDowell's pioneering effort earned for him the title, "father of abdominal surgery." He was followed in America by other courageous men, such as Nathan Smith, Goldsmith, and Rogers. The introduction of anesthesia in 1846 initiated a second epoch in the history of ovariotomy; the operation was no longer a novelty, but a common proceeding. Nevertheless, there continued to be long debates *pro* and *con*, and not inconsiderable feuds. The Atlee brothers (1843-1883) of Philadelphia became the great proponents of ovariotomy. One of them, Washington L. Atlee, in spite of his skill and renown, was forced to deliver an address revealing the indignities to which he had been subjected by other surgeons. One of his colleagues, on passing his house on Arch Street, said, "There lives the greatest quack in Philadelphia." Another remarked, "'Tell Dr. Atlee that I will not meet him in consultation because he undertakes to perform operations not recognized by the profession." One eminent surgeon, in 1851, went so far as to open his lecture with the following irrelevant words: "Gentlemen, it is my painful duty to announce to you that a respectable lady who, a few days ago, came from New York to this city with an ovarian tumor which was removed by Dr. Atlee, returned to that city today a corpse."

In spite of such opposition the practice of performing ovariotomy continued to spread in the United States and abroad. Cazeaux, in France, for six months had a battle on his hands in regard to the treatment of ovarian tumors; opposing him were such great names as Velpeau, Cloquet, and Trousseau. Most of the German school favored the operation, but even a few distinguished German surgeons continued to speak of it as sheer murder. Dr. Emiliani of Bologna, Italy, may perhaps be credited with being the first European ovariotomist(1) and second in the world to McDowell; in 1815 he removed an ovarian tumor 9 by 5 cm. from a 26-year-old woman, a baker's wife of "lymphatic temperament." The patient survived not only the operation but also the blood-letting, tartar emetic, hemlock, and other remedies, and thereafter produced six children in undaunted succession!

When Dr. J. Marion Sims was president of the American Medical Association, the sum of ten thousand dollars was requested for a "McDowell Memorial Fund" to be used in awarding prizes for the best essays written on diseases and surgery of the ovaries. A remark made then to the effect that Americans are very prone to lose sight of the teachings and examples of their men of genius seems to have been borne out, for by 1876, only one hundred and fifty-four dollars had been collected toward this fund! Only during the past thirty years has due tribute been paid to McDowell in any form of extensive writings and recognition; at the opening of the Duke Hospital in 1930 his name was given to the women's surgical ward. Kentuckians, at least, valued the memory of this great benefactor, and erected a small obelisk to honor him in the little town of Danville, Kentucky.

ROBERT N. CREADICK, M.D.
Duke Hospital,
Durham.

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1. A German named Chrysmar may possibly have priority over Emiliani.

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**The rate of patient turnover** in all VA hospitals has risen to a monthly average of more than 45 per cent because of improved medical care.

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May, 1947

## DR. ISAAC H. MANNING

But for unavoidable obstacles the Manning issue would have been published in February, the month which marked the first anniversary of Dr. Manning's death. It is quite fitting, however, that it should follow so closely the annual meeting of the Medical Society of the State of North Carolina. During his lifetime Dr. Manning was such a large part of North Carolina medicine that he is sorely missed at all convocations of North Carolina doctors.

Dr. Manning served as president of the State Medical Society in 1933, and as its secretary during the unexpired term of Dr. Tom Long, in 1942. While he achieved more than ordinary success in many fields—as a teacher, as a physician, and as an administrator—he is probably remembered by most doctors for having conceived the idea of the Hospital Saving Association—the first hospital insurance plan sponsored by a state medical society—and for having nurtured it through its infancy to sturdy maturity. Had he lived, no doubt he would have felt that North Carolina's medical care plan represents further growth of his brain child.

Those who wrote the tributes to Dr. Manning which form the prologue to this issue were acting as spokesmen for "his boys" who began their medical careers under his tutelage. They spoke not only for his former students, however, but for the many other friends who loved him: he was too big to be claimed exclusively by those whose fortune it was to have him for a teacher.

* * * * *

## THE VIRGINIA BEACH MEETING

This month, for the second time in its history, the Medical Society of the State of North Carolina held its annual meeting outside the state. While the decision to meet at Virginia Beach was made from necessity rather than from choice, most of those who made the long pilgrimage to attend felt well repaid. The drawback of distance was reflected in the attendance. Only 444 were registered — just half the number who came to Pinehurst last year, and, except for the Bermuda cruise meeting, the smallest attendance for the past twenty years.

The House of Delegates transacted a tremendous amount of business in its two lengthy sessions on Monday. President William Coppridge, in a clear-cut report to the House, listed the noteworthy legislative achievements of the past year as follows: (1) the adoption by the legislature of the medical care program; (2) the agreement of the nurses to modify, temporarily at least, their demand for an all-nurse board of examiners; (3) the passage of a bill to license practical nurses who have had one year's hospital training; (4) the defeat of "the perennial osteopath bill"; and (5) the defeat of the naturopath bill.

President Coppridge stressed the need for improvement in the present organization of our Society. To this end he recommended the employment of a full-time executive secretary, but stated that since this man would be a layman, he should work under the supervision of the secretary-treasurer of the Society, who is now and who should always be a physician. Another recommendation was that a committee of at least fifteen members, with each medical school represented, should be appointed and should hold quarterly meetings. The function of this committee should be to consider ways and means for making our Society's organization more efficient. Dr. Coppridge also stressed the importance of enlisting the younger men in the work of the Society, since they will eventually have to take over the responsibility for organized medicine in the state.

Dr. Roscoe McMillan's report as secretary-treasurer was encouraging. The membership of the Society has reached an all-time high of 2,073, and forty county societies have every physician in the county enrolled as a member. It was gratifying to learn that the NORTH CAROLINA MEDICAL JOURNAL made quite a respectable profit for the Society last year.

Among the highlights of the House of Delegates meeting was the report of Dr. Ivan Procter, secretary of the Board of Examiners. The board has met five times within the past year, and has granted licenses to 232 applicants.

A prolonged discussion took place over the relation of the Society to the Industrial Commission. As a result of the recommendations offered by the two committees reporting on this subject, headed by Drs. J. P. Rousseau and G. W. Murphy respectively, it is probable that some rather radical steps may be taken to improve, if possible, the status of doctors who do a considerable amount of industrial work. The responsibility for further action is left largely with the executive committee.

Dr. Hubert B. Haywood, chairman of the legislative committee, reported that more than one thousand bills had been introduced in the 1947 legislature, but that no legislation unfavorable to the medical profession was passed. He asked that he be relieved of the chairmanship of this committee, since he felt that he had carried the burden long enough. His report, carrying with it his resignation, was accepted, with thanks for the faithful service he has rendered.

A resolution was offered from Robeson County to amend the By-Laws so that the county officers of each society might take office in April or May, instead of January. The reason given for this proposed change was that the new officers should have the benefit of attending a state meeting by way of preparation for their task. This resolution was unanimously adopted.

Since the transactions of the House of Delegates will be published in the August issue, no attempt has been made to give an exhaustive summary of the proceedings.

The First and Second General Sessions were well attended, and the close attention paid was a tribute to the excellence of the papers presented. Most of the papers read at these sessions and in the section meetings will be published in later issues of the JOURNAL.

The climax of the meeting was the President's Night banquet and dance. As an innovation this year the President's Address was given at the banquet instead of at the First General Session. This change met with universal approval, and President Coppridge's address was enthusiastically received. It will be published in the June issue of the NORTH CAROLINA MEDICAL JOURNAL.

The nominating committee took their responsibility seriously, and their report seemed satisfactory to all. Dr. James F. Robertson of Wilmington was chosen as president-elect. Other officers elected were: Dr. V. K. Hart of Charlotte, first vice president; Dr. J. G. Raby of Tarboro, second vice president; Dr. G. G. Dixon of Ayden and Dr. J. LaBruce Ward of Asheville, members of the State Board of Health for the next four years; and Dr. L. R. Hedgpeth of Lumberton, member of the Hospital Saving Association.

Dr. P. W. Joyner of Enfield, Dr. Alban Papineau of Plymouth, and Dr. Harry Johnson of Elkin were designated delegates to the Medical Society of Virginia, and Dr. Frank Ward of Lumberton, Dr. C. H. Pugh of Gastonia, and Dr. Lewis Gaskin of Albemarle were named delegates to the South Carolina Society. Delegates to Georgia are Dr. Robert Mathews of Greensboro, Dr. W. A. Hoover of Murphy, and Dr. Ben Kendall of Shelby. The Tennessee delegation consists of Drs. B. O. Edwards, Westbrook Murphy, and S. L. Whitehead, all of Asheville.

## INDIANA SETS A GOOD EXAMPLE

The midwestern states have long been noted for their independent thinking in various matters, especially in politics. This spirit of independence is exemplified in a resolution recently adopted by the Indiana Legislature, and inserted in the *Congressional Record* for February 10. The resolution might well be adopted by our own state, among others. It is short enough and important enough to be quoted in full:

> "Indiana needs no guardian and intends to have none. We Hoosiers—like the people of our sister States—were fooled for quite a spell with the magician's trick that a dollar taxed out of our pockets and sent to Washington, will be bigger when it comes back to us. We have taken a good look at said dollar. We find that it lost weight on its journey to Washington and back. The political brokerage of the bureaucrats has been deducted. We have decided that there is no such things as 'Federal' aid. We know that there is no wealth to tax that is not already within the boundaries of the 48 States.
>
> "So we propose henceforward to tax ourselves and take care of ourselves. We are fed up with subsidies, doles, and paternalism. We are no one's stepchild. We have grown up. We serve notice that we will resist Washington, D. C., adopting us.
>
> "**Be it resolved by the House of Representatives of the General Assembly of the State of Indiana (the Senate concurring),** That we respectfully petition and urge Indiana's Congressmen and Senators to vote to fetch our county courthouse and city halls back from Pennsylvania Avenue. We want government to come home.
>
> "**Resolved further,** That we call upon the legislatures of our sister States and on good citizens everywhere who believe in the basic principles of Lincoln and Jefferson to join with us, and we with them, to restore the American Republic and our 48 States to the foundations built by our fathers."

## EDITORIAL NOTES ON THE NINETY-THIRD ANNUAL SESSION

The Officers' Breakfast at 7:30 Tuesday morning was well attended. The fact that every seat at the table was occupied is a tribute to our secretary-treasurer. The officers of the county societies could not help but gain inspiration from the addresses of Dr. Hugh McAllister of Lumberton, who presided, President Coppridge, President-Elect Frank Sharpe, and Dr. Joseph S. Hiatt, president of the Hoke County Medical Society.

Comments were heard on all sides about the excellent service given by the Cavalier Hotel and by the other hotels on the beach. This was in contrast to the hurried and harried atmosphere of the Carolina Hotel last year. One member of the Auxiliary expressed this feeling quite well when she said, "Last year at Pinehurst we were treated like boarders; here we are treated as guests."

* * *

Perhaps the greatest ovation given during the meeting was received by Mrs. Paul McCain, after Secretary Roscoe McMillan had presented her to those present at the banquet Tuesday night. This was a spontaneous demonstration of the affection and admiration which the doctors and their wives have felt for her and her late husband.

* * *

The two members of the editorial board of the NORTH CAROLINA MEDICAL JOURNAL whose terms expired this year were Dr. Reece Berryhill, dean of the University of North Carolina Medical School, and Dr. Josiah C. Trent of the Duke University School of Medicine, who was elected last January to fill the unexpired term of the late Dr. Frederic M. Hanes. Both these members were re-elected without opposition. Dr. Ernest W. Furgurson of Plymouth was elected by the editorial board to serve out the unexpired term of the late Dr. Paul P. McCain. Dr. Furgurson's choice is a happy one. He is a veteran and is one of the younger members of the Society who have evinced an interest in medical writing. He is just the sort of young man who can and should take an active part in the affairs of the Society. No doubt he will be a valuable addition to the editorial board.

* * *

Mr. Edmund H. Harding of Washington lived up to his reputation as "The Tar Heel Humorist." He kept his audience spellbound with one story after another, and there was enough philosophy in his address to make it well worth while.

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The weather throughout the whole session was well nigh perfect. The only objection which might be offered was that it lured too many members away from the House of Delegates and the scientific sessions.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.

RALEIGH

DEAD BODIES: *Unauthorized removal of portions of a dead body by one authorized to examine it, and his refusal to return such portions, on demand, to the surviving spouse or next of kin, is actionable.*

The plaintiff in this cause was the beneficiary under an accident insurance policy issued to her husband. He died under circumstances claimed to be accidental, and at the request of the insurance company the plaintiff authorized an autopsy. Two physicians representing the widow were secured for the purpose of witnessing the autopsy. They were present during the postmortem examination, and assumed responsibility for her interest at that time.

The plaintiff charged, and it was proved in the trial court, that the pathologist removed the heart, one kidney, and the brain for further study and failed to return them at the completion of the autopsy. There was a demand on the part of the widow for possession of the organs, but this was refused by the doctor who performed the examination. The court assumed that the physicians representing the widow had consented to the removal of the organs, but instructed the jury that the demand of the widow counteracted this consent by agency, and that the act upon the part of the defendant was actionable.

The jury awarded the widow the sum of $1500.00 in damages. This award was made upon the basis of mental anguish as alleged in the complaint. The defendant immediately appealed the case to the Circuit Court of Appeals.

When the case came up to be heard by the appellate court, this tribunal was of the opinion that the findings of the trial court should be sustained. In this connection the court stated that "a surviving spouse is entitled to the custody of a deceased person for the purpose of preservation and burial, and may maintain an action for damages against anyone who unlawfully and without authority mutilates or destroys such bodies. The authority to perform an autopsy includes acts and operations necessarily involved therein. It contemplates the removal of the internal organs, but does not contemplate their retention."

Strictly speaking, the law would appear to prohibit the retention of tissue even for microscopic study. The law has been said to be "nothing if not reasonable," and as a certain amount of tissue is essential for minute study, legal restrictions would not be expected to interfere with such an important source of information—provided, of course, that only the amount of material reasonably necessary for this purpose is removed and retained.

As a precaution, in securing permission for autopsies, a full explanation should be furnished the person who is authorizing the autopsy. The likelihood of litigation is thus lessened, and the physician-family relationship is usually maintained.

(District Court, S.D. Cal., N.D., March, 1933. V. 3., Federal Supplement, p. 358)

# BULLETIN BOARD

## PRESIDENT'S MESSAGE

## ISAAC HALL MANNING

In the annals of medicine and medical education in North Carolina the name of Isaac Hall Manning will be awarded a position of eminence that time will not efface. It is fitting that those of us who knew him well should dedicate this issue of our JOURNAL to his memory. Too often contemporaries of great men neglect to record adequately their appreciation and esteem of their colleagues, but leave this opportunity to future historians.

There are few members of our Society, I am sure, who knew Dr. Manning intimately in so many capacities as I. When I was a medical student, I learned to love him as a teacher of physiology. Three years later, as resident physician at the University Infirmary, I knew him as a careful and skillful doctor. Then, in later years, while he was president of the Medical Society and director of the Hospital Saving Association, I came to respect him in the unusual role of medical sociologist. He remained actively engaged in medical endeavors until the very end of his useful career.

Medical students of the University during the period from 1913 to 1939 had the splendid experience of being exposed to the influence of four great men whom Dr. George Carrington has called "The Four Horsemen"—Drs. Manning, MacNider, Mangum, and Bullitt. During most of these years Dr. Manning served as dean. These men were able, through thorough medical teaching and by maintaining proper relationships with other institutions, to keep the University of North Carolina highly regarded in medical education. Dr. Manning, like all the others, dreamed of the day when the people of this state would elect to furnish to its citizens a complete medical education. The knowledge of this decision was denied him. Now that the people have elected to do so, his spirit, along with those of his colleagues who survive him, will act as a guiding light to those of us in the Society who seek to make the University School a complete and distinguished medical institution.

Dr. Manning's outstanding trait of character was his rugged honesty. Students soon learned this. His friends all accepted it. He never indulged in sycophancy or adulation. A word of praise from him could always be accepted as well deserved.

In his later years he became much interested in one of medicine's primary problems—better and more widespread hospitalization. His ideas in this regard constituted a basis upon which our medical care program is founded. He maintained that better medical care for the people depends upon better hospital service. Insurance, he insisted, is the answer to medical costs. In this respect his thinking was in advance of most medical men of that day.

Nothing gives me more pleasure, as one of "his boys," than to attest to his eminence as a teacher, his skill as a doctor, and his distinction as a medical economist. It must be left to someone more able than I to write a detailed statement of his value to his university and his state, but it is my fervent hope that it will be done.

Isaac Hall Manning, coming from an illustrious North Carolina family, was a great North Carolinian. His memory must be perpetuated. His contributions to medical education and medical care within the state were outstanding. The Medical Society of the State of North Carolina is honored in dedicating this number of its JOURNAL as a testimony of its love and respect for him.

W. M. COPPRIDGE, M.D.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA

Drs. C. D. Van Cleave and A. V. Jensen attended the meeting of the American Association of Anatomists in Montreal on April 3, 4, and 5. Dr. Jensen presented a paper entitled "Effect of Intermittent Exposure to 30,000 Feet Simulated Altitude on Brain Structure." This paper was written by Dr. Jensen in collaboration with Dr. William F. Windle.

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Dr. Cornelius T. Kaylor, assistant professor of anatomy at the University of Syracuse School of Medicine, has been appointed associate professor of anatomy and will assume his new duties in the summer.

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Dr. Kenneth M. Brinkhous, professor of pathology, presented a paper entitled "Thrombin and Its Clinical Applications" at the Southeastern Surgical Congress Postgraduate Assembly in Louisville, Kentucky, on March 10.

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On January 22 more than 150 medical alumni attended a memorial luncheon at the Carolina Inn held in honor of the late Dr. I. H. Manning, former dean and Kenan Professor Emeritus of Physiology. Dr. George Carrington, of Burlington, president of the Alumni Association, presided, and tributes were paid to Dr. Manning's contributions to medicine by Drs. W. R. Stanford and Paul F. Whitaker, President Graham, and Chancellor House. Mrs. I. H. Manning, Sr., and her three sons, Dr. I. H. Manning, Jr. and Messrs. John and Howard Manning were present.

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Dr. Edward G. M. McGavran, professor of public health and preventive medicine of the University of Kansas School of Medicine, has been appointed dean of the University of North Carolina School of Public Health to succeed the late Dr. Milton J. Rosenau and Acting Dean Herman G. Baity. He will also be head of the Department of Epidemiology. Dr. McGavran received his A.B. degree from Butler University in 1924, his M.D. from Harvard in 1928, and his M.P.H. from the Harvard School of Public Health in 1935.

Dr. McGavran has served as Director of Health and County Health Officer in Hillsdale, Michigan, for the W. K. Kellogg Foundation, as Health Commissioner of St. Louis County, Missouri, and Director of the West Virginia Public Health Training Center and Monogalia County Health Department at Morgantown, in each of which positions he has developed training centers for public health workers. He is also interested in research in tropical diseases and has carried on work for the Rockefeller Foundation in this field in Egypt, India, Hawaii, and Central America. Prior to going to Kansas, Dr. McGavran was on the faculty of the Washington University Medical School and acting head of the Department of Public Health and Preventive Medicine.

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Mr. Paul D. Haney has been appointed associate professor of sanitary engineering of the School of Public Health, beginning March 12, 1947. Mr. Haney received his B.S. in chemical engineering from the University of Kansas in 1933, and his M.S. in sanitary engineering from Harvard University, 1937. From 1942 until his arrival at the University, Mr. Haney was Director and Chief Engineer, Division of Sanitation. Kansas State Board of Health and associate professor of sanitary engineering, University of Kansas. Prior to that he was granted a leave of absence to accept a temporary commission in the U. S. Public Health Service. He was assigned to the Ohio River Pollution Survey.

Dr. H. G. Baity, acting dean and professor of sanitary engineering of the School of Public Health, attended the meeting of the Association of Schools of Public Health in Boston, Massachusetts, on April 9.

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Dr. Harold J. Magnuson, research professor of experimental medicine in the School of Public Health, attended the symposium, Recent Advances in the Investigation of Venereal Diseases held in Washington, D. C., on April 17, under the auspices of the Syphilis Study Section of the National Institute of Health. Dr. Magnuson presented two papers, entitled "The Rate of Development and Degree of Acquired Immunity in Experimental Rabbit Syphilis" and "The Minimal Infectious Inoculum of S. Pallida (Nichols Strain), and a Consideration of its Rate of Multiplication **in Vivo.**"

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The Department of Public Health Nursing, School of Public Health, University of North Carolina, announces a change in the curriculum leading to a certificate in public health nursing.

Beginning September, 1947, the curriculum will consist of three quarters of academic work, plus one quarter of field work.

In addition to the certificate program, the School of Public Health offers a Bachelor of Science degree in public health nursing. The School of Public Health also offers an M.P.H., or a Master's degree may be obtained in sociology or education.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

Dr. W. Henry Hollinshead, professor of anatomy, has accepted an appointment as professor of anatomy at the Mayo Foundation and Graduate School of Medicine, University of Minnesota, Rochester, Minnesota. In this position he will organize and head a Department of Anatomy which is being established by the Mayo Clinic and will continue his research upon the peripheral nervous system and mechanisms in the reflex control of respiration and blood pressure.

Dr. Hollinshead is one of the original staff of the Duke University School of Medicine, having been a member of the Department of Anatomy since 1930. He will assume his new duties July 1.

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The Department of Medicine has recently added to its staff the following members:

Dr. John Hickam, graduate of Harvard Medical School in 1940, house officer at Peter Bent Brigham Hospital 1940-1942, resident in medicine at Grady Hospital (Emory) 1942-1943, member of the Medical Corps of the Army of the United States 1943-1946, and research fellow of the American College of Physicians (Emory) 1946-1947.

Dr. Frank L. Engel, graduate of Johns Hopkins in 1938, house officer at Mount Sinai Hospital, New York 1938, National Research Council fellow in physiological chemistry at Yale 1941-1943, research assistant in physiological chemistry at Yale 1943-1945, associate in medicine at Emory, 1945-1947.

Dr. J. P. Myers, graduate of Stanford Medical School in 1937, house officer in medicine at Stanford University Hospitals 1936-1938, research fellow at Harvard, 1938-1939, assistant resident and resident at Peter Bent Brigham Hospital 1939-1942, Chief of General Medicine Section at 8th General Hospital (Harvard Unit) U. S. Army 1942-1944, and of 163rd General Hospital 1944-1945, associate in medicine at Emory, 1946-1947.

## NEWS NOTES FROM THE STATE BOARD OF HEALTH

Pulmonary tuberculosis, the leading cause of death among the communicable diseases, was responsible for 1,065 deaths in 1946 as compared to 1,287 for 1945, thereby establishing a new low. Pertussis, another major cause of death among the communicable diseases, showed the lowest number of both cases and deaths in the history of the state, except for the year 1936. Pertussis cases totaled 3,394 and deaths 57. Diphtheria, the next most important communicable disease insofar as deaths are concerned, caused fewer cases than ever before, but the number of deaths did not drop as low as the previous record. The 1946 cases were 590 in number as compared to 1,375 the previous year and 665 for 1944, the best year on record up to that time. Diphtheria deaths reported to date for 1946 numbered 53 as compared to 35 for 1944. Typhoid fever continued to decline as a public health problem. Only 54 cases were reported during the past year.

Malaria among returning service men has been reported frequently, but there appears to have been no appreciable spread to the civilian population. Cases for 1946 totaled 369 as compared to 554 the previous year. The chief communicable disease problem in the state that might be considered as war-connected is that of syphilis. In 1946 there were reported 2,452 cases of primary and secondary syphilis among males as compared to 1,522 the preceding year. There has been a corresponding increase among females—2,121 cases for 1946 and 1,550 for 1945.

Rocky Mountain spotted fever continued a twelve-year upward trend during 1946. There were 66 cases and 21 deaths reported. Endemic typhus fever, which had shown a ten-year upward trend in 1944 and was expected to continue upward in the southeastern United States, has declined in the past two years.

One new communicable disease problem made its appearance in this state during 1946. An outbreak of epidemic ringworm of the scalp was called to the attention of health officials in Alamance county by Dr. Callaway of Duke Hospital. Approximately 300 cases of this disease have been located in the area.

The past year brought a record number of births; preliminary estimates give a total of well over 100,000. The birth rate of 26.3 per 1,000 population is the highest recorded since 1928. The crude death rate of 7.6 deaths per 1,000 population is the lowest ever recorded in North Carolina. The maternal and infant death rates have both continued to decline.

The ten leading causes of death for 1946 show no change over 1945 and are as follows:

1. Heart disease
2. Intracranial vascular lesions
3. Nephritis
4. Cancer
5. Congenital malformations, prematurity, and neonatal diseases
6. Pneumonia
7. Violent deaths and non-vehicular accidents
8. Pulmonary tuberculosis
9. Automobile accidents
10. Other diseases of the digestive system.

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An important preparedness conference was held in Goldsboro on April 3, when representatives of various cooperating agencies met to plan for immediate mobilization in the event of any future outbreak of infantile paralysis anywhere in North Carolina. Among those participating were representatives of the National Foundation, the State Board of Health, local health units, and Parent-Teacher Association units, private physicians, nurses, health educators, municipal officials, and various others. North Carolina doctors who took part on the program were Dr. Eric Bell, Dr. Carl Reynolds, Dr. Arthur London, Dr. William H. Roberts, Dr. George D. Wilson, and Dr. S. B. McPheeters.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

The annual meeting of the North Carolina Tuberculosis Association was held in Goldsboro on May 1 and 2. Among the North Carolina doctors participating were Dr. Hillis L. Seay, Dr. H. B. Ivey, Dr. H. Stuart Willis, and Dr. R. L. Carlton.

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Dr. W. D. Rodgers of Warrenton has been named a member of the executive committee of the Warren County Tuberculosis and Health Association.

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Dr. A. L. O'Briant of Raeford has been appointed a member of the Hoke County Tuberculosis Association.

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The North Carolina Tuberculosis Association and the Division of Vocational Rehabilitation have agreed upon principles of cooperation requisite to a united approach to the development of maximum vocational rehabilitation opportunities for persons with a history of tuberculosis.

## FIFTH DISTRICT MEDICAL SOCIETY

The Fifth District Medical Society met in Southern Pines on April 17. Speakers at the afternoon session were Dr. William Dosher of Wilmington, Dr. W. B. Bradford of Charlotte, Dr. Rowland F. Ziegler of Florence, S. C., and Drs. W. L. Thomas and R. A. Ross of the Duke University School of Medicine. Dr. Oren Moore of Charlotte gave the address at the dinner meeting.

Dr. C. O. Bristow of Rockingham is president of the Fifth District Society.

## ASHE-WATAUGA COUNTIES MEDICAL SOCIETY

Dr. C. T. Jones of West Jefferson reported a case of "Multilocular Pseudomucinous Cystadenocarcinoma" at the meeting of the Ashe-Watauga Counties Medical Society on April 16. At the business meeting which preceded the scientific session, the constitution and by-laws of the new society were presented and adopted.

## CATAWBA VALLEY MEDICAL SOCIETY

A regular meeting of the Catawba Valley Medical Society was held on April 16 in Morganton. The program consisted of papers by Dr. A. M. Lang, Dr. G. N. Billings, and Dr. John Reece.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

The Edgecombe-Nash Counties Medical Society held its April meeting in Rocky Mount on April 9. Dr. P. T. Meyers of Kinston discussed "Cancer Prevention," and presented some movies.

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. J. Warrick Thomas of Richmond, Virginia, was guest speaker at the April meeting of the Forsyth County Medical Society, held in Winston-Salem on April 8. His subject was "The Handling of Certain Allergic Problems as Medical Emergencies."

## HALIFAX COUNTY MEDICAL SOCIETY

The Halifax County Medical Society met in Roanoke Rapids on April 11. The program consisted of a talk on "Allergy in General Practice" by Dr. W. Randolph Graham of Richmond, Virginia.

## NEWS NOTES

Dr. J. D. Gilland, Jr., of Charlotte has recently moved to Kingstree, South Carolina, where he is continuing the practice of general surgery, and is director of surgery at the Kelley Memorial Hospital.

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Dr. Horace H. Hodges has announced the opening of offices in Charlotte for the practice of internal medicine and gastroenterology. He is associated with Dr. Monroe T. Gilmour.

## AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The Third American Congress on Obstetrics and Gynecology, September 8-12, 1947, in St. Louis has scheduled three panel-type morning sessions on the following subjects:

(1) **Anesthesia and Analgesia**, Tuesday, September 9, Dr. Nicholas J. Eastman, chairman, with the cooperation of Dr. J. P. Greenhill, Chicago; Dr. John Adriani, New Orleans; Dr. Stuart Cullen, Iowa City; and Dr. Arthur Baptisti, Hagerstown.

(2) **Cancer**, Wednesday, September 10, Dr. Robert A. Kimbrough, Philadelphia, chairman, with the cooperation of Dr. John Randall, Iowa City; Dr. Charles L. Martin, Dallas; Dr. Joe V. Meigs, Boston; and Dr. Herbert Schmitz, Chicago.

(3) **Cesarean Section** on Thursday, September 11, Dr. Edward Schumann, Philadelphia, chairman, with the cooperation of Dr. Edward G. Waters, Jersey City; Dr. Edward Davis, Chicago; Dr. E. D. Plass, Iowa City; and Dr. William Benbow Thompson, Hollywood.

The afternoon meetings of the medical section of the Congress will consider the psychosomatic aspects of pregnancy on Tuesday; pregnancy complicated by heart disease, diabetes and tuberculosis on Wednesday; and recent advances in endocrinology on Thursday.

## AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, INC.

The general oral and pathology examinations (Part II) for all candidates will be conducted at Pittsburgh, Pennsylvania, by the entire Board from Sunday, June 1, through Saturday, June 7, 1947. The Hotel William Penn in Pittsburgh will be the headquarters for the Board. Formal notice of the exact time of each candidate's examination will be sent him several weeks in advance of the examination dates. Hotel reservations may be made by writing direct to the Hotel William Penn.

Candidates in military or naval service are requested to keep the secretary's office informed of any change in address.

Applications are now being received for the 1948 examinations. For further information and application blanks address Paul Titus, M.D., Secretary, 1015 Highland Building, Pittsburgh 6, Pennsylvania.

(BULLETIN BOARD CONTINUED ON PAGE 329)

# AUXILIARY

## OUR TUBERCULOSIS ASSOCIATIONS

Health is a priceless possession for an individual. Freedom from contagious disease is one of the greatest assets a community can possess.

A disease which is spread from person to person becomes a matter of public concern, because even one case is a potential threat to the entire community. One person with a contagious disease may give it to one, two, or more other persons, who in turn may pass it on to still others until scores may fall victim to the disease.

This is the reason that communities insist that cases of contagious diseases be reported to the health authorities. The greatest aid to health authorities in preventing the spread of a contagious disease is its early recognition. If the disease is discovered immediately, precautions can be taken to prevent others from coming in contact with the patient and thus possibly catching the disease.

There is one contagious disease which, unfortunately, is seldom recognized in its early stage. It is tuberculosis. This disease, which kills more young people between 13 and 35 than any other disease, frequently reaches an advanced stage before unmistakable symptoms appear. Meanwhile, however, the disease may be caught by others. Meanwhile, too, the individual may be losing his health, for the chances of recovery from tuberculosis are greatest when the disease is found early.

Even tuberculosis, however, can be found early through means of chest x-rays. If every adult had periodic chest x-rays, every new case of the disease would be found early, before the individual had lost his own health and before he had spread the disease to others.

Because of the danger which tuberculosis presents to the individual and to the community, our national, state, county and city tuberculosis associations were formed years ago to spread information about the disease and how it can be controlled.

The task of these associations is to find cases of tuberculosis, to find them in that early, most easily curable stage; to disseminate information about the nature of the disease and what steps can be taken to prevent its spread; to demonstrate the need for establishing and maintaining adequate facilities for detecting tuberculosis and for caring for its victims.

Such tasks may be undramatic, but they are necessary. If tuberculosis is to be brought under complete control in our communities, these associations will need our loyal support.

Mrs. S. S. Saunders,
*Press and Publicity Chairman,*
High Point

* * * *

**Last Call for reservations for the Twenty-fourth Annual Convention of the Woman's Auxiliary to the American Medical Association, which will be held at Haddon Hall Hotel, Atlantic City, New Jersey.**

**ATLANTIC CITY EXTENDS A HEARTY WELCOME TO YOU**

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**The physician and the public** must be constantly impressed to respect and treat tuberculosis as a highly contagious disease. Margery Blahd, Eleanor I. Leslie, and Sol Roy Rosenthal, Am. Jour. Pub. Health, July, 1946.

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**The general hospital plays a very important role** in the organization for the fight against tuberculosis inasmuch as it offers facilities necessary to tie together the agents of research, prevention and treatment. But many general hospitals refuse admission to patients afflicted with pulmonary tuberculosis and many insist upon the removal of patients whenever diagnostic study discloses the presence of this disease. Public health education has accomplished much by way of removing the barriers of prejudice which formerly restrained general hospitals from accepting tuberculosis patients and modern methods in the control of infection have made possible a certain degree of intercommunication among patients with various types of illness without danger of cross-infection. Consequently, it is entirely feasible for general hospitals knowingly to accept for treatment patients suffering from pulmonary tuberculosis.—Hospital Survey News Letter, Feb., 1946.

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**Infection with tuberculosis may be compared to the action of an incendiary bomb.** It may come to rest in any isolated area of the body, generally first in the upper respiratory passages, and then may quickly be dispersed to other areas, like the bomb fragments causing incendiary fires.

The germ of tuberculosis may reproduce rapidly and set up secondary zones of inflammation and disease. Treatment is essentially like the suppression of the bomb. Nature assists in the process in trying to wall off the germ and build up a wall around it which isolates it from oxygen and other food nutriments brought to it by the blood stream. Putting out the fire of tuberculosis demands early finding of the infection and a mustering of all body forces of resistance to put out the fire in the same manner as the community would deal with an incendiary bomb.—Health and Safety Medium, Feb., 1946.

# BOOK REVIEWS

**Peripheral Vascular Diseases.** By Edgar V. Allen, M.D., M.S., in Medicine, F.A.C.P., Division of Medicine, Mayo Clinic, Assoc. Prof. Medicine, Mayo Foundation, Graduate School, Univ. Minnesota; Diplomate of the American Board of Internal Medicine; and Nelson W. Barker, M.D., M.S. in Medicine, F.A.C.P., Division of Medicine, Mayo Clinic, Assoc. Prof. Medicine, Mayo Foundation, Graduate School, Univ. Minnesota; Diplomate of the American Board of Internal Medicine; and Edgar A. Hines, Jr., M.D., M.S. in Medicine, F.A.C.P., Division Medicine, Mayo Clinic, Assoc. Prof. Medicine, Mayo Foundation, Graduate School, Univ. Minnesota; with associates in the Mayo Clinic and Mayo Foundation. 871 pages, with 386 illustrations, 7 in color. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1946.

A consideration of peripheral vascular disease should not limit itself simply to diseases of the peripheral arterial system. Such a concept has been all too common in the past. The peripheral vascular system is composed of three separate sets of vessels—arteries, veins, and lymphatics. This book considers all of these components of the peripheral vascular system and discusses the diseases of each of them individually and in their relationship to each other. This is one of the prime reasons for its excellence. It discusses the gross and microscopic anatomy of peripheral blood vessels, as well as the approaches to the diagnosis of vascular diseases. Special methods of investigation are given in detail.

The excellent discussions of the disorders involving the peripheral arteries include not only those lesions which arise apparently in the arteries themselves, but also those diseases which arise in neighboring structures and involve the arteries secondarily. Included in this section are excellent chapters on tumors of the blood and lymph vessels. Disorders of the venous and lymphatic vessels are considered extensively and in detail. For all of these abnormalities, both medical and surgical treatments are thoroughly discussed.

The book is comprehensive in its scope and gives the specific details for conducting practically all of the special tests and examinations which are now used for the accurate diagnosis of peripheral vascular disease. Discussions of the various forms of treatment are likewise given in splendid detail.

The authors have combined excellent and extensive reviews of the literature with the result of their own experiences in the Mayo Clinic. One of the most valuable features of this work is the frank expression of the authors' honest opinion about the various measures used in diagnosing and treating peripheral vascular lesions.

This is by far the best and most inclusive work yet published on peripheral vascular disease. It should prove invaluable as a text and reference source.

**Bacterial Chemistry and Physiology.** By John Roger Porter, Associate Professor, Department of Bacteriology, College of Medicine, State University of Iowa. 1072 pages. Price, $12.00. New York: John Wiley and Sons, Inc., 1946.

This is an excellent book for anyone interested in biology to have available. The general discussions of bacterial metabolism constitute a very good review of the principles of biochemistry. A great deal of practical information is given both in the text and in the many detailed tables, while copious references to the literature lead to further pertinent information on practically all topics discussed. It is certainly to be recommended to anyone working with microorganisms and also to anyone wishing to review biochemistry in a pleasant way.

**The Personality of the Preschool Child.** By Werner Wolff, Ph.D., Professor of Psychology, Bard College. 341 pages. Price, $5.00. New York: Grune & Stratton, 1946.

Dr. Wolff has presented a controversial subject in an unusually clear manner.

He has emphasized the need of approaching the preschool child in a dynamic way. He explains logically the reason that such objective tests as the Binet-Simon intelligence test may not give a true picture of the child's potentialities. Many of children's behavior disorders can be traced to aberrations in what Dr. Wolff calls, "the child's search for his self."

Discussion of the significance of children's drawings makes up a large part of the book. Considerable importance has been attached to the interpretation of these pictures, and the explanations of the interpretations are exceptionally clear and interesting.

This book should be of interest to anyone concerned with either normal or abnormal child development. Pediatricians would find this book of theoretical value, and intelligent parents might understand better their children's behavior.

# In Memoriam

### James M. Judd, M.D.

Dr. James M. Judd, a beloved pioneer civic leader of Wake County, was born in Wake County, January 29, 1871, and died at his home in Varina, March 7, 1947. He was graduated from the Baltimore Medical College in 1897. He was licensed to practice medicine in the state of North Carolina the same year. He began his medical career in lower Wake County, near what is now Varina.

At the time Dr. Judd began practicing medicine in North Carolina there were no good roads, no automobiles, no telephones, and the quickest way to get a physician was by horseback. At that time lower Wake County was practically a wilderness.

Dr. Judd was ever a true friend to the poor, and showed the same faithful, capable, and courteous service to every patient. A patient's financial status did not influence the quality of attention that Dr. Judd gave. He lived a full, useful and successful life. In addition to his professional career he was a true civic pioneer and leader, always interested in improving the social, religious and living conditions in his community. He was a successful farmer. He was one of the organizers of the Bank of Varina and was its president until his death. He built and operated a small hosiery mill. He was an active and influential member of the Methodist Church and a liberal contributor.

Dr. Judd has not left his community without a physician. His son, Dr. Glenn Judd, is a most useful and capable young physician who is carrying on the work his father began nearly half a century ago.

In Dr. Judd's death Wake County has lost one of its most useful citizens, the church a faithful and useful member, and the medical profession a valuable member. Our sympathy goes out to the members of his family.

Respectfully submitted,
John B. Wright, M.D.
Verne S. Caviness, M.D.
Committee, Wake County Medical Society

April 10, 1947

* * * *

**George Stephenson Coleman, M.D.**

Dr. Coleman was born in Pasquotank County, July 4, 1880, the son of Henry Butler Coleman and Louisa Brigman Coleman. He studied medicine at the Medical College of Virginia, from which he was graduated in 1907. He secured a license to practice medicine in North Carolina and began his practice at Kenly in the same year. He joined the State Medical Society the following year and remained an active and interested member of organized medicine throughout the remainder of his life.

During World War I, Dr. Coleman served overseas for two years with the 81st Division, with the rank of captain. In 1933 he left Kenly to take a position in Raleigh as Medical Director of the State Prison. He held this position for four years. After completing postgraduate studies in proctology in Atlanta, New Orleans, and the Mayo Clinic, he began the private practice of proctology in Raleigh in 1937.

Until the time of his death Dr. Coleman was a member of the staffs at Rex Hospital, St. Agnes Hospital, and Dix Hill. He was a faithful member of the Edenton Street Methodist Church, and throughout his life took a deep interest in civic and fraternal affairs. He was always deeply interested in organized medicine and was frequently a delegate to the State Medical Society meetings. He was president of the Johnson County Medical Society while practicing in Kenly, and after moving to Raleigh he was elected president of the Wake County Medical Society. He was scrupulously careful of his medical ethics and made it a rule to speak ill of no one.

In his death we experienced a deep loss. Our sympathy goes out to the members of his family.

Respectfully submitted,
John B. Wright, M.D.
Verne S. Caviness, M.D.
Committee, Wake County Medical Society

April 10, 1947

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**New Salt Substitute Developed by Winthrop**

People who cannot or should not use salt may now at least have the savor. Meeting newest medical concepts of salt-free diets, scientists of the Winthrop Chemical Company, Inc., have developed a new salt substitute. Called Neocurtasal, the product will be sold in retail drug stores, according to Dr. Theodore G. Klumpp, Winthrop's president.

The new product contains no sodium. It has a salty flavor, however, is palatable, flows freely, and is used in the same manner as salt. It is being distributed in 2-ounce shakers and 8-ounce bottles. The product is described as "odorless, white, crystalline, some hygroscopic powder, consisting of potassium chloride, ammonium chloride, potassium formate, calcium formate, magnesium citrate and starch."

# BULLETIN BOARD

(CONTINUED FROM PAGE 326)

## NURSING COUNCIL SEEKS ANSWER TO SHORTAGE OF REGISTERED NURSES

As a basic step in overcoming the acute shortage of registered nurses and other problems in the field, the National Nursing Council, representing fourteen leading professional organizations, is undertaking an intensive study of the registered nurse's real job and the changes in education that she requires for it. The study is being financed by a grant of approximately $28,000 from the Carnegie Corporation of New York.

## CONFERENCE ON CEREBRAL PALSY

At the first conference of its kind, specialists working with children with cerebral palsy—"spastics"—met at the U. S. Children's Bureau, Social Security Administration, Federal Security Agency, March 26-28, and pooled their experience preparatory to a major effort by the Bureau and state crippled children's agencies to get help to these "tragically neglected children."

This contemplated expansion of services to children with cerebral palsy is in line with a general expansion of services to crippled children made possible with the increased federal funds for this work with crippled children, authorized last August under amendments to the Social Security Act. State agencies, which are responsible for administration of these programs under plans approved by the Children's Bureau, now have on their lists the names of more than 40,000 children with cerebral palsy.

## AMERICAN HEART ASSOCIATION

The appointment of Dr. Charles A. R. Connor as associate medical director of the American Heart Association was announced recently by Dr. Howard F. West, president of the Association.

Dr. Connor will work with Dr. David D. Rutstein, medical director, in the development of the Association's program of research, service and public education in diseases of the heart and circulation.

## RHEUMATIC FEVER LIBRARY

The Colorado Rheumatic Fever Library has been established at the University of Colorado School of Medicine in response to the great need for the assembling in one place of all that has been written on the subject of rheumatic fever. It is desired that this library contain reprints or copies of every article that has been written on rheumatic fever.

At first efforts will be made to collect all of the reprints that may be available, and when reprints can no longer be obtained, photostatic or typewritten copies of desired articles will be made. Publications, or copies thereof, from countries outside of the United States will be collected in a similar manner and where necessary will be translated. This material will be cross-indexed and assembled in bound volumes by years. The collection will ultimately be made available to all workers in the field of rheumatic fever in the form of a photostat and an abstract service. It is hoped that this body of information, readily available to all interested persons, will form a major contribution to the solution of the basic problems of etiology and therapy of rheumatic fever.

Valuable assistance can be given by all libraries, all medical journals, all those writing in the field of rheumatic fever and all those willing to dispose of reprint collections by contributing papers relating to rheumatic fever, as well as by making a practice of sending reprints of future publications.

## AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

The new annual Research Award of the American Pharmaceutical Manufacturers' Association was presented for the first time when the Association assembled for its fortieth annual meeting on April 28 at Boca Raton, Florida. Dr. Bernardo Alberto Houssay of Buenos Aires, Argentina, was the first recipient.

Dr. Houssay, who until recently was professor of physiology at the Medical School of the University of Buenos Aires, a post which he first assumed in 1919, is an authority on the inter-relationships of the various hormones. He is particularly noted for furthering medical knowledge of the pituitary gland, the "master" gland of the body. It was through Dr. Houssay's work that the relation of the pituitary gland to diabetes was firmly established.

## VETERANS ADMINISTRATION

The number of veterans awaiting hospitalization in Veterans Administration hospitals has declined 21 per cent in the last eight months, VA reported recently. The reduction resulted from the acquisition of "surplus" military hospitals, increasing the number of beds available for veterans, and from the more rapid turnover of patients in VA hospitals through improved medical care.

On July 1, 1946, there were 29,450 veterans on VA hospital waiting lists, whereas, on March 1, 1947, the figure had fallen to 23,200—a drop of 6,250 veterans, or 21 per cent.

## UNITED SERVICE TO CHINA, INC.

Forty-five of the 125 Chinese doctors, dentists, public health experts and nurses to whom fellowship awards will be made annually are now in this country engaged in advanced studies at leading American universities in fourteen states. Seven additional fellows are now **en route** to the United States.

The fellowship awards were bestowed by the American Bureau for Medical Aid to China, a cooperating agency of United Service to China, as part of a three-year program under which six national medical colleges in various parts of China will receive aid designed to elevate their standard of medical education to that of the best institutions in the United States.

ABMAC's new long-range program has been launched to help supply China's pressing need for more and better-trained medical and public health personnel. China has only about 13,000 qualified doctors for its 450 million population, and should have at least 266,000 if the Chinese people are to have anything approximating adequate medical care.

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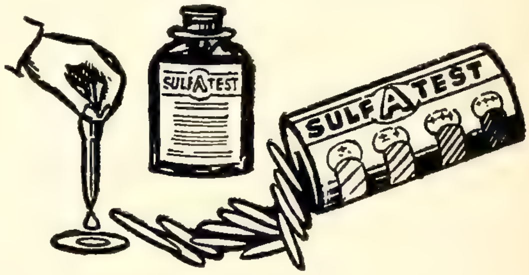

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NORTH CAROLINA MEDICAL JOURNAL

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# PRESIDENT'S ADDRESS

WILLIAM M. COPPRIDGE, M.D.

DURHAM

As a Virginian I regard it an unusual privilege to address you, my colleagues of North Carolina, here in my native state. After living in North Carolina for thirty years I am proud to call myself a Tar Heel, but like all Virginians, wherever they may live, I take some pride in announcing my place of birth. Many Virginians simply refuse to leave home. When the boundary line between Virginia and North Carolina was moved northward some one hundred and fifty years ago, the Virginians left to the south refused to remain, saying they would not become North Carolinians because they had always heard that the climate of North Carolina is distinctly inferior to that of Virginia. We are grateful to the people of this commonwealth for their willingness to accept and welcome us here.

This assembly of North Carolinians on the soil of Virginia in this critical year of world uncertainties is reminiscent of the muster of North Carolinians in defense of Virginia and the Southern cause in another critical time in the great War between the States. The blood of the many thousands of Tar Heels, wounded or buried on the Virginia battlefields, is forever a part of the common heroic heritage of our two states and of our reunited states. Those North Carolinians marched shoulder to shoulder with Virginians under the immortal Lee, the valiant Jackson, the gallant Pelham, the daring Stuart, and with all the others who so courageously carried on the struggle for the lost cause.

As we meet here today, Virginians and North Carolinians are again striving to reach common goals, and in their efforts there is a considerable degree of cooperation. Those who mustered on this historic soil in the 1860's went forth to conduct war and destroy life. Their grandsons of both states are today concerned in a great united effort to preserve peace, promote health, and save life. The peoples of these two states have shared a noble inheritance that the years must never weaken nor efface.

The honor you have conferred upon me, the presidency of this Society, is one to be greatly cherished, and, in all humility, I thank you for it. It has been an honor poorly deserved and, I am afraid, inadequately executed. Those who would accept office in organized medicine today take unto themselves responsibilities of much importance. Any progress that may have been attained by your Society this year can be attributed to the teamwork of your splendid Executive Committee, together with the valuable help of your secretary and those of our Society who, through past experience, have contributed notably to our undertakings.

What I will say to you at this time represents a composite of ideas gained from work with our several committees and from conferences with the executive officers and with others, regarding our progress and our needs for the future. Since our last meeting many matters of importance have presented themselves for consideration. Your Executive Committee has striven to meet them squarely. The Society as a whole has not always approved of their action. There has not been complete accord. This is not a surprising

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Delivered at the President's Night banquet, Medical Society of the State of North Carolina, Virginia Beach, May 13, 1947.

circumstance among more than two thousand doctors. No one will doubt that each has acted in conformance with the dictates of his conscience; and none will deny each the right to his own opinion. Controversy is the mother of progress. Advancement comes after exchange of ideas, with all sides of various propositions exposed.

As president of the Society, I have on all occasions sought to promote the views and endorsements of the Executive Committee, since county and district societies are there represented. I sincerely hope that in the altercations that have ensued no wounds have been opened that will not quickly heal. Reasonable unity among us is necessary if we are to cope successfully with the challenges facing us in these days of social revolution and rapid advance of medical science.

### *Medicine as a Social Science*

While the office of president of your Society involves considerable activity and at least a moderate element of what may be termed work, I can assure you that these are well compensated by a number of pleasant and agreeable factors. Not the least of these rewards is that of meeting and knowing more intimately a large segment of our profession. The outstanding impression I have gained from these contacts this year is that the doctors of our state are becoming increasingly conscious of the social aspects of our calling. Medicine today is freely acclaimed a social science. The very special purpose of our work as doctors is to keep individuals adjusted to their position in society by preventing disease among them or by hastening their recovery and return to activity after sickness. The promotion of health and the restoration of the sick to their former position among their associates are indeed our prime objectives. Unfortunately, our medical educators, in planning our training, have not in the past given full recognition to this fact. The rapid strides of science have so pressed the medical curriculum that this situation must be regarded as excusable. Then, too, since disease is a biologic process, its causes must be sought in the realm of nature. The treatment of the sick person is concerned primarily with the skillful use of physical, chemical, and biologic forces. Therefore, medicine is a science and the practitioners must be scientists. The medical curriculum has been designed upon this dictum.

From my contacts this year it is obvious that our members are conscious of the fact that their purely scientific training is not enabling them to cope easily with all the problems that arise before them. One hears in our county society meetings eager discussions of medical insurance; of medical care of large groups such as school children and veterans; of spastics and mental cases; of infant and maternal welfare; of nursing and various forms of medical technology; of hospitals and clinics; and of other topics that they find are important in the conduct of their work aside from the actual care of patients.

Changes that have occurred in the practice of medicine over the past twenty years, and which doubtless were hastened by the war, have served to fix our attention more and more upon these social aspects of our work. In the past, the sick person consulted his doctor as an individual, and was treated as such; their relationship was largely personal. Today much of the practice is done by groups of doctors aided by several types of medical assistants. Persons are treated in hospitals and clinics and are seen by many professional people before they are given the final answer regarding their ailment. Not too many years ago a hospital was operated by a doctor, and his personality dominated the institution. It is not to be denied that many advantages accrued from this system. Because of the multitude of medical and surgical services, however, as well as the expense involved in the operation of a modern hospital, it has become necessary for communities to accept responsibilities for maintenance of these institutions.

The tendency of our population to organize into groups representing different spheres of interests has made it possible for them to demonstrate the need for greater spread of good medical care, and to emphasize the excessive expense of illness. It has been easy for national radical elements of our population to magnify these demands and attempt to capitalize upon them. Those who would seek to impose upon us a federal system of compulsory health insurance, and at the same time form a huge national bureaucracy with unlimited power, have been at least temporarily thwarted in their

William M. Coppridge, M.D.

schemes because of a rather belated interest on the part of our profession in the social phases of our work. This interest is nationwide: but I say with considerable pride that the Medical Society of the State of North Carolina has gone further and accomplished more in this regard than any other group in this country.

### *North Carolina's Medical Care Program*

I shall not attempt to recount to you the details of the Medical Care Program in our state. It is enough for us to realize and clearly understand that the people of our state have spoken with unmistakable emphasis; that it is their will; that state funds shall be used to supplement local effort and federal grants to provide medical facilities within the state; and that the state shall provide complete medical education for its citizens. This decision came after painstaking studies which showed that North Carolina needs better distribution of facilities, additional personnel, and more insurance against illness. The plan stresses local control of medical resources, and thereby conforms to the American democratic philosophy of regulation; it is the direct antithesis of centralized or federal domination of the type that has been sponsored by the insurgent elements in our national Congress. Our program brings existing facilities, and those to be provided, to every reputable physician in a given community, regardless of his political affiliations and without interference from others. In this way it stimulates initiative and professional ambition. It is truly a sincere effort on the part of the medical profession and the citizens of our state to promote a state-wide system of improved medical care and professional freedom.

The successful prosecution of this enterprise—the first in the nation on a state-wide basis—was remarkable in many respects. In it we found all classes of our people engaged in an overall, concerted effort to effect a service for the state. Sitting down together in ardent deliberation were leaders of both races, industrialists and labor representatives, farmers and city folk, Republicans and Democrats, people of various religions and creeds—all working together in the interest of a common cause. The drama they enacted lends reason for optimism for future achievements in the field of social welfare in our Southland. It will serve as an example of whole-hearted cooperation of the citizenship that may well be emulated throughout our section when people come together to study problems of community interest and welfare.

Since the program of the Medical Care Commission is essentially medical, it is incumbent upon us as the fundamental medical agency of the state to foster the aims of our citizens and to take to our hearts most seriously the issues involved. We, and we alone, can bring to a successful climax the hopes that have been expressed. The people want better distribution of good medical care. They have voted their money for it, knowing that the doctors of this state are the only ones who can deliver it. Their confidence is in us. This Society will not underestimate the confidence our people have placed in us, but will, through improved organization and increased determination, seek to strengthen itself for the challenge that is before us.

How may we proceed to serve these requirements better? We speak often of organized medicine. Are we sufficiently organized? Why are we organized? How may we attain our goal? These questions must be answered in the minds of all of us; for then only can we hope to proceed to the task of carrying on a progressive program that will react to the credit of our Society and to the welfare of the state.

### *The Need for Greater Organization*

Are we sufficiently organized? To this question I think most of us will answer negatively. It is true that geographically and physically we have an adequate skeleton arrangement of groups. That there is little coordination or concentration of effort we will all agree. Our system is as it was fifty years ago. We have been fortunate in securing, repeatedly, able practitioners who have been willing to make the sacrifice of serving as secretary for us, and carrying the burden of our organization. My memory of Dr. L. B. McBrayer and Dr. Tom Long is that of efficient and earnest men who did all they could for this Society. Dr. Roscoe McMillan is now serving well, and is due most credit for our operation during the past year. His kindness to me will always be remembered. He is due the whole-hearted thanks of this Society, because he has done and is doing all that any practicing doctor can do for us.

It seems certain that we have outgrown this system. Ours is the only organization of comparable size in the state that does not have a full-time executive secretary. Such an official, acting as an assistant to our present secretary, is necessary if details of our various activities are to be properly tied together. Permanent offices adequately staffed will be required. This Society should dignify itself in such a way as to command respect of the citizenry, commensurate to its importance in public affairs of the state. This objective can be accomplished only through a more efficient organization.

### *The Purposes of Organized Medicine*

After a half century of experience it is evident that doctors of today are ready to answer the question, "Why are we organized?" In the early history of the American Medical Association, recently so well recorded by Dr. Morris Fishbein, one may read that in that day the chief function of the medical society was the preservation of the influence of the doctors. During that half century we have witnessed the birth of many organizations. In some instances they have served the public interest well; but all too often their chief function has come to be self-elevation and domination of other interests, until today organized minority pressure groups are possibly the chief detriments to national unity and well-being. There are some professional organizations whose chief aim is to increase their prestige and income, and at the same time reduce hours of service to the public. Physicians of this country, with their high standards of education, are not making this mistake. The more progressive element of our profession is demanding strong coordination of effort dedicated to public service, for in this way only will we be capable of fulfilling our obligation to our profession and to the people. We, then, are organized to promote in every way possible the extension of better medical care to all segments of our population.

### *Problems Facing Organized Medicine in North Carolina*

If this be our purpose, how may we best pursue it? Every effort should be made to convey our intentions to the public, and in that way secure its confidence. As a whole, our profession has never taken public opinion very seriously and, as a result, we do not now enjoy the degree of confidence of the people that we deserve. It is evident then that improvement of public relations is one of our prime immediate requirements. A stronger organization with increased personnel will be most helpful in accomplishing this end.

#### *Spreading the costs of medical care*

The profession has a real responsibility in making its services more generally available. The increased cost of medical care calls clearly for some form of group payment, in order that the risks of sickness may be more evenly spread. The economics of illness deserves much study. I am glad to report to you that many of the best minds in our Society are now engaged in studying this problem of complete medical coverage by insurance. Poverty and low income breed disease. Medical and hospital expenses are often excessive, if not at times devastating.

The House of Delegates last year directed the appointment of a special committee to cooperate with others in an effort to promote amalgamation of our two local hospital insurance companies. Realizing the importance of this merger, I sought the services of the ablest and most beloved member of our Society to direct this work. He, Paul McCain, readily accepted the commitment. The tragedy of his death occurred upon his journey to the second meeting of his committee. In his memory, let it be recorded that he died in the service of the Medical Society of the State of North Carolina that he loved and served so well.

#### *Health conditions among the Negroes*

Health conditions among the Negroes of our state seriously demand our attention. Sickness and need raise no racial question. Our profession will do well to study and cooperate fully with the Medical Care Commission's program to improve medical facilities for these people who constitute one third of our population.

#### *Shortage of hospital personnel*

Hospitals and clinics are our workshops; and the efficient practice of modern medicine demands that the physician have access to, at least, a diagnostic institution of some type. The present problems of the hospital are many and deserve the sympathetic consideration of us all. It is well to remember that in the conduct of the modern hospital no less than twenty-odd specialized medical workers are necessary. The shortage of these people is acute. It would seem incumbent upon our larger hospitals and our medical schools to advance immediately plans for producing more of this personnel. Physicians can do much to assist the institutions in recruiting our youth for service in these fields. The Medical Care Commission's plan stresses improved medical educational facilities at all levels, and places upon the state the responsibility of assuming leadership in this regard, in cooperation with all existing schools and hospitals. This proposed integration of medical care and medical education holds great promise of success.

### *Overemphasis on specialization*

It would seem to one who professes no special knowledge or training in medical education that there is need at this time for a careful survey of methods and results in this field. With the general spread of better facilities there will be a place of increasing importance for the general practitioner in the years ahead. He must not become the forgotten man in medicine; but he surely will if 90 per cent of the graduates continue to seek places in the specialties. Medical education must seek means to dignify general practice by special undergraduate training, as well as by continuing postgraduate education. The war has taught us the wide prevalence of emotional disabilities, and emphasizes the fact that practitioners must abandon the old thinking habits of rigidly separating body from mind. It is to be hoped that our North Carolina schools will take the lead in this country in training their students adequately in psychiatry, psychology, and sociology, so that their graduates will meet the demands of an enlightened public for interpretation of these emotional disorders.

### *Shortage of nurses*

In evaluating our personnel needs, special mention of nursing is warranted, since it constitutes a most serious problem confronting our hospitals and doctors at this time. Your Executive Committee supported the State Hospital Association in sponsoring the practical nurses' bill in the last legislature. One-year courses are being organized in several hospitals, and candidates for the classes are sought at this time. It will introduce a new type of worker in medicine, and one that is sorely needed. Most bedside nursing in the hospital and in the home can be efficiently performed by the trained practical nurse. All of our hospitals, large and small, are capable of training them; and it is to be hoped that the next few years will see many of these practical workers administering to our patients.

### *Other problems*

Other committees of your Society are considering such matters as our relation with the Workman's Compensation Commission, revision of the Medical Practice Act with provisions for a basic science law, improved postgraduate medical education, infant and maternal welfare, better medical attention to veterans—all are working ably and earnestly to the end that the Society may intelligently deal with these affairs. We are especially indebted to Dr. Hubert Haywood and his Legislative Committee for their skillful and efficient work during the meeting of the legislature. Every issue in which we had an interest was settled to our satisfaction. This fact should emphasize the measure of confidence that the people of the state impose in their medical profession. It presents to us the very real responsibility of justifying their trust and esteem.

## *Conclusion*

Let us improve our organization, bring our units into closer understanding one with the other, reconcile, so far as possible, our various opinions, and democratically arrive at decisions that speak the voice of the majority. Public confidence and respect are precious and priceless. Medicine in North Carolina will advance in the years to come in proportion to the unity within our Society directed toward improved medical care of all groups of our citizens. Ours is a great opportunity at this time. We must be prepared to pay today's price for tomorrow's values. A fine profession, unsurpassed medical schools, a large hospital construction program, a loan fund for medical students, state contribution to our hospitals, all supported by strong public opinion, constitute the media that doctors of no other state have been offered. That we will gratefully and graciously accept the challenge confronting us, I have no doubts. It is my firm conviction that the doctors of North Carolina, being deeply interested in the welfare of their state, will in united effort strive to carry to our people the best in hospital and medical service.

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# SOME CLINICAL AND PHYSIOLOGIC PROBLEMS IN CASES OF PORTAL CIRRHOSIS

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There are few chronic diseases which have been studied in as detailed and thorough a manner over so long a period as has portal cirrhosis. In the fifty years which followed Laennec's classic description in 1826(1), the pathologic and clinical aspects were catalogued; one may find a great part of the basic data bearing on these points in Murchison's well-known lectures in 1877(2). During the next forty-five years no notable progress was recorded, but with the publication in 1921 of observations made by Mann and Magath on the effects of experimental hepatectomy(3), a period of physiologic research was ushered in. The studies of the past quarter century have greatly extended medical knowledge of the function of the liver and its metabolic activity, and have emphasized the reparative and regenerative capacity of the liver. The relation of diet and nutrition to the structure and function of the liver has been demonstrated during this same period.

Now, at the end of another quarter century of continued study, it appears worth while to take stock of the problems which remain and to record recent progress. It seems particularly appropriate to do so at this time, since the most carefully studied epidemic of infectious hepatitis on record is subsiding and an unusual opportunity to study its possible effects on the production of the more chronic forms of hepatic injury is at hand. It is the purpose of this paper to call attention to new ideas and developments as they refer to portal cirrhosis, and to comment on their physiologic and clinical aspects. To begin with, a definition of cirrhosis is necessary. For purposes of this discussion, one may use the term as Mallory did, in its broadest pathologic sense, and classify as cirrhosis "all sclerosed conditions of the liver whether progressive or not in which destruction of the liver cells is associated with actual or apparent increase in connective tissue."(4) As various authors have stated, there is only one cirrhosis, which may present a multitude of clinical and anatomic variations, depending on a diversity of factors.

## *The Nutritional Factor in Hepatic Injury*

As has been pointed out many times, a large number of toxic agents may cause degeneration and necrosis of the hepatic cords, and their continued action may produce chronic destructive changes in the hepatic lobules, with subsequent nodular regeneration and proliferation of connective tissue from the portal triads. The nutritional state of the liver at the time these toxins are active apparently makes a tremendous difference in the pathologic response. It is now believed that nutritional factors *alone*, without the aid of hepatoxic substances, may produce degenerative lesions.

There is a considerable amount of evidence of particular importance bearing on the relation of diet and nutrition to human cirrhosis. To present this evidence, a brief consideration of some experimental data is required. In 1942, Gyoergy and Goldblatt(5) noted that parenchymatous and fatty degeneration, necrosis, and sometimes fibrosis developed in the livers of rats maintained on a diet deficient in the vitamin B complex. These changes were prevented by the addition of yeast or yeast extract to the diet. Earlier, Rich and Hamilton(6) had shown that a diet adequate in respect to all its essential constituents and containing adequate amounts of thiamine hydrochloride, nicotinic acid, riboflavin and vitamin B was capable of producing marked

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From the Division of Medicine, Mayo Clinic.

1. Laennec, R. T. H.: Traite de l'Auscultation me'diate et des Maladies des Poumons et du Coeur, Paris, J. S. Claude', 1826, vol. 2.
2. Murchison, C.: Clinical Lectures on Diseases of the Liver, ed. 2, New York, William Wood & Company, 1877.
3. Mann, F. C. and Magath, T. B.: Studies in the Physiology of the Liver: I. Technic and General Effects of Removal. II. The Liver as a Regulator of the Glucose Concentration of the Blood. III. The Nitrogen Constituents of the Blood following Removal of the Liver. Am. J. Physiol. 55:285-287 (March) 1921.
4. Mallory, F. B.: Cirrhosis of the Liver, New England J. Med. 206:1231-1239 (June 16) 1932.
5. Gyoergy, P. and Goldblatt, H.: Hepatic Injury on a Nutritional Basis in Rats. J. Exper. Med. 70:185-192 (Aug.) 1939.
6. Rich, A. R. and Hamilton, J. D.: Experimental Production of Cirrhosis of Liver by Means of Deficient Diet. Bull. Johns Hopkins Hosp. 66:185-198 (March) 1940.

hepatic cirrhosis in rabbits. In animals fed exactly the same diet, but with yeast substituted for the various individual components of the B complex, hepatic lesions did not develop.

Recently, attempts have been made to identify the component of the B complex which is specifically responsible for this phenomenon. Since infiltration of the liver with fat is among the earliest of pathologic changes in experimental cirrhosis, it is natural that particular attention should have been paid to lipotropic substances in this respect. Choline and also methionine have been shown to have a protective effect when fatty infiltration of the liver is induced in laboratory animals. Cystine has a similar effect, while the combination of cystine and choline appears to have even greater protective value. In this connection the representative experiments of Glynn and Himsworth(7) may be considered. They found that, when rats were fed protein-deficient diets, massive acute necrosis of the liver developed in a period of fifteen to fifty days. Restoration of casein to the diet was completely protective. Feeding experiments further narrowed the field, revealing that 20 mg. of methionine a day sufficed to maintain the liver in normal condition. This specific protective effect of methionine thus becomes one of considerable practical importance.

Observations on human subjects subsisting on inadequate and restricted diets are by no means common. The traditionally poor diet of the chronic alcoholic patient and its possible effect on the development of cirrhosis were discussed years ago by Connor(8). Dietary cirrhosis, uncomplicated by hepatotoxins, has also been studied, but to a much more limited extent. Snapper(9), in commenting on the great frequency of cirrhosis in North China, stated that malnutrition is certainly one of the principal factors in the development of the disease. The diet of the coolie, as described by this observer, is certainly inadequate in respect to protein at least. Hardikar and Rao(10) recently have reported a high incidence of cirrhosis of the liver in southeastern India, where rice is the principal ingredient of the diet, and have commented on the fact that in parts of India where jawar and wheat constitute the staple diet, hepatic disease is relatively rare. Among South African Negroes (Bantus), who subsist chiefly on a meager diet of corn and fermented cow's milk, the incidence of both deficiency disease and cirrhosis is unusually high, the latter condition being noted in four necropsies out of five. Gilbert and Gillman(11) have noted this fact and have shown that cirrhosis developed in rats fed the diet of the natives. In both Indians and Bantus a full diet is usually followed by a disappearance of symptoms.

Meienberg and I(12) have recently reported some observations on a group of prisoners of war who had subsisted on a diet extremely low in protein and sources of the vitamin B complex for from one to nearly four years. No hepatoxic agents were involved, and the incidence of infectious disease during confinement was no greater among the persons studied than in a control group of prisoners. Yet, of the 50 prisoners studied, 19 had various abnormalities of hepatic function, usually associated with a palpable liver, peripheral edema and signs of deficiency disease. In 2 of these cases the clinical picture of cirrhosis was present. One patient, who had required abdominal paracentesis while in a prison camp, still had ascites when examined in a naval hospital, and presented gross laboratory evidence of hepatic dysfunction. Biopsy of the liver showed a definite histologic picture of cirrhosis. In the second case ascites developed after the patient's release from prison, and at the time of examination he had an enlarged liver with strongly positive cephalin-cholesterol flocculation reactions and moderate retention of bromsulfalein. An attempt at needle biopsy was unsuccessful. Both patients recovered on dietary treatment.

It is of course true that few physicians will be likely to encounter a pure dietary cirrhosis, but observations such as those mentioned leave little doubt that the liver of the human being is rendered vulnerable by suboptimal states of nutrition and that a bad

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7. Glynn, L. E. and Himsworth, H. P.: Massive Acute Necrosis of the Liver: Its Significance and Experimental Production, J. Path. & Bact. 56:297-305 (July) 1944.
8. Connor, C. L.: Etiology and Pathogenesis of Alcoholic Cirrhosis of Liver, J.A.M.A. 112:387-390 (Feb. 4) 1939.
9. Snapper, I.: Chinese Lessons to Western Medicine, New York, Interscience Publishers, Inc., 1941.
10. Hardikar, S. W. and Rao, V. G.: Ascites in Hyderabad (Deccan); Preliminary Note, J. Indian M. A. 13:1-9 (Oct.) 1943.
11. Gilbert, C. and Gillman, J.: Diet and Disease in the Bantu, Science, n.s. 99:398-399 (May 19) 1944.
12. Meienberg, L. J. and Snell, A. M.: Nutritional Deficiency as a Probable Cause of Hepatic Damage in Repatriated Prisoners of War, Gastroenterol. 7:430-441 (Oct.) 1946.

diet, sufficiently prolonged, will produce cirrhosis. It is generally believed that the extent and severity of the recent epidemic of viral hepatitis were partially conditioned by dietetic factors, at least in some military personnel affected.

### *Do the Residues of Viral Hepatitis Lay the Groundwork for Cirrhosis?*

A definitive answer to this question would be a major contribution to medical knowledge. It will be recalled that Rokitansky(13) and other pathologists of his generation considered cirrhosis to be the end product of an infectious process. There are case reports in the older literature which appear to record the rapid development of atrophic cirrhosis directly following an illness which could well have been infectious hepatitis (see case CXII in Murchison's lectures(2)). Pratt and Stengel(14), Rennie(15), and others(16), notably Jones(17), have called attention to similar cases. The process may be more chronic. Jones described two brothers taken ill during an epidemic of infectious hepatitis; one died, while the other survived fifteen years with chronic jaundice and progressive failure of hepatic function. The latter patient eventually died with ascites and hepatic insufficiency.

From Sweden come word-of-mouth reports of a considerable group of women past the menopause who, following what appeared to be infectious hepatitis of average severity, developed the clinical picture of progressive hepatic destruction with jaundice, ascites, and a terminal state indistinguishable from that encountered in cases of portal cirrhosis. The whole illness was of about a year's duration. The relation of the syndrome to infectious (viral) hepatitis, and the reasons for the peculiar age and sex distribution remain subjects for conjecture.

It is now well established that a considerable number of persons who suffered from infectious jaundice while in military service did not make the expected complete recovery. Some remained jaundiced for many months, but gradually regained their health; in others, who showed little or no jaundice even during their acute illness, the liver remained larger than normal, definite signs of hepatic dysfunction were demonstrated by appropriate tests, and there was a marked tendency to relapse following physical activity(18). Still others apparently recovered more or less completely, but had a definitely lowered tolerance to physical activity and presented some laboratory evidence, usually minimal, of hepatic dysfunction. I have personally observed examples of each group, as have many other clinicians interested in the problem. Whether the infecting agent is the IH virus(19) producing the naturally occurring form of the disease or the SH virus, which is responsible for the artificially transmitted type having a long incubation period, does not seem to matter in the production of chronic changes. The clinical cases of two young men seen in recent weeks may be used as examples in this connection.

### *Case 1*

In this case infectious (epidemic) hepatitis developed in New Guinea sometime during 1945. The patient had been quite ill and apparently had spent several months in convalescence. He had not been particularly well since then, and complained of weakness, loss of weight, and easy fatigability. At the time this paper was written he had a palpable liver, definite fetor hepaticus, two well-developed nevi araneosi, slight retention of bromsulfalein, and a decidedly positive cephalin-cholesterol flocculation. The prothrombin time was 23 seconds. The urine was negative for bilirubin; the serum bilirubin was normal.

### *Case 2*

This patient, a man aged 33 years, had been known to have diabetes mellitus for about seven years. He had been under treatment with insulin and had not had any particular difficulty in controlling his glycosuria when he was at the Mayo Clinic in December, 1946. In July, 1946, he had sustained an injury to his thorax in an automobile accident, when he suffered from broken ribs, shock, and puncture of a lung. He received some plasma at that time, although the exact amounts were not known. In November, 1946, anorexia, generalized aching pains, malaise, and chronic dull epigastric distress developed. One week later jaundice appeared, and the patient stated that he had acholic stools and bile-stained urine at the time of its appearance. The jaundice increased in intensity for about a week but then seemed to diminish and he felt somewhat improved. This period of improvement, however, was followed by a severe relapse which necessitated hospitalization. At that time edema of the ankles and swelling of the abdomen developed. It was nec-

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13. Rokitansky, C.: Handbuch der pathologischen Anatomie, Wien. Bei Braumueller & Seidel, 1842, vol. 3
14. Pratt, J. and Stengel, A.: Toxic Cirrhosis Resulting from Acute Liver Atrophy, Am. J. M. Sc. 175:1-11 (Jan.) 1927.
15. Rennie, J. B.: Infective Hepatitis, with Special Reference to Prognosis, Am. J. M. Sc. 210:18-29 (July) 1945.
16. Altschule, M. D. and Gilligan, D. R.: Chronic Latent Hepatitis Following Catarrhal Jaundice, New England J. Med. 231:315-317 (Aug. 31) 1944.
17. Jones, C. M.: Some Serious Aspects of Infectious (Catarrhal) Jaundice, M. Clin. North America 7:819-832 (Nov.) 1923.
18. Barker, M. H., Capps, R. B. and Allen, F. W.: Chronic Hepatitis in the Mediterranean Theater, J.A.M.A. 129:653-659 (Nov. 3) 1945.
19. Neefe, J. R.: Recent Advances in the Knowledge of "Virus Hepatitis," M. Clin. North America 30:1407-1443 (Nov.) 1946.

essary to perform a paracentesis on December 22, and 3 quarts (3 liters) of fluid were withdrawn.

At the time of our examination the patient was deeply jaundiced, apathetic, and depressed. There was no fever. His blood pressure was 100 systolic, 60 diastolic. Examination of the heart and lungs was negative. The abdomen showed some distention and contained a small amount of fluid. The liver was very large and firm and reached to the level of the umbilicus. The spleen was not felt. The extremities showed a minor degree of pitting edema.

Urinalysis gave essentially negative results except for glycosuria. The concentration of hemoglobin was 12.4 Gm. per 100 cc. of blood. Erythrocytes numbered 4,080,000 and leukocytes 6,700 per cubic millimeter of blood. Stained smears of the blood revealed macrocytosis. The flocculation reaction for syphilis, and roentgenograms of the thorax, gallbladder, stomach, and esophagus were negative. The concentration of urea was 36 mg. per 100 cc. of blood. The concentration of bilirubin fell from 10.0 mg. to 5.2 mg. per 100 cc. of serum while the patient was under observation. The concentration of cholesterol was 383 mg. and that of cholesterol esters 203 mg. per 100 cc. of plasma. The concentration of protein was 6.73 Gm. per 100 cc. of serum, and the phosphatase was 16 Bodansky units. Fecal urobilinogen was 463 mg. in twenty-four hours. The prothrombin time was 19 seconds.

Needle biopsy showed fairly normal hepatic cellular structure, with some bile staining and proliferation of connective tissue about the portal triads.

A number of questions present themselves in connection with these patients. Do their livers still contain the living virus, and, if so, will a slow, progressive necrosis of hepatic tissue with nodular regeneration of hepatic cells and increased proliferation of connective tissue ensue? Or will the hepatic lesion heal, leaving the remaining cellular structure vulnerable to deficient diets and hepatoxic substances and infectious processes? The studies of Lucke'(20), Roholm and Iversen(21) and of Dible and his associates(22) have clearly defined the residual pathologic lesions of infectious hepatitis, which may be minor or in some instances of considerable magnitude. Polack's observations, recorded long before the present epidemic, indicate that functional disturbances at least may persist for years(23). The most recent report, that of Klatskin and Rappaport(24), indicates that there may be detectable residues in approximately half the patients who have previously had epidemic hepatitis.

In my opinion, physicians would do well to be on the lookout for three types of patients of the category mentioned previously. First is the patient who has not completely regained his health following an attack of viral hepatitis and whose weight and strength remain below their usual level. These patients should be examined frequently for signs of hepatic or splenic enlargement, nevi araneosi, palmar erythema, macrocytic anemia, and other hepatic functional and nutritional disturbances. When possible, hepatic functional studies should be done serially, and it should be remembered that a negative reaction at one time does not necessarily preclude a positive reaction in the ensuing months. The careful studies of Neefe(25) and Neefe and Reinhold(26) on human volunteers infected with hepatitis virus indicate that two types of tests should be employed: (1) those dependent on disturbances of excretory function of the liver (bromsulfalein, urine bilirubin, and serum urobilinogen), and (2) those dependent on alterations of the plasma proteins (flocculation tests). These may not necessarily run a parallel course—hence the need for more than one type of test.

A second group of patients deserving of more general attention are those who have very chronic jaundice of the type designated as "cholangeitic cirrhosis" by Watson and Hoffbauer(27). Since their conception of the syndrome has been published only recently, it may be wise to restate it here. They regard this variety of cirrhosis as one which is characterized by the phenomena of regurgitation jaundice (hyperbilirubinemia, hypercholesteremia, and hyperphosphatasemia), with the metabolic functions of the liver generally well preserved. The pathologic changes described range from minimal changes in the cholangioles to nodular cirrhosis. They have described cases in which the pathologic lesions were shown to progress in this manner over a period of years. The relation of this group to so-called hypertrophic biliary cirrhosis on the one hand and

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20. Lucke', B.: The Structure of the Liver after Recovery from Epidemic Hepatitis, Am. J. Path. 20:595-619 (May) 1944.
21. Roholm K. and Iversen, P.: Changes in the Liver in Acute Epidemic Hepatitis (Catarrhal Jaundice) Based on 38 Aspiration Biopsies, Acta path. et microbiol. Scandinav. 16: 427-442, 1939.
22. Dible, J. H., McMichael, John and Sherlock, S. P. V.: Pathology of Acute Hepatitis: Aspiration Biopsy Studies of Epidemic, Arsenotherapy and Serum Jaundice, Lancet 2:402-408 (Oct. 2) 1943.
23. Polack, E.: Chronic Hepatitis in Young Persons, with or without Intermittent Jaundice, Acta med. Scandinav. 93: 614-621, 1938.
24. Klatskin, G. and Rappaport, E. M.: Late Residuals in Presumably Cured Acute Infectious Hepatitis, Ann. Int. Med. 26:13-26 (Jan.) 1947.
25. Neefe, J. R.: Results of Hepatic Tests in Chronic Hepatitis without Jaundice, Gastroenterol. 7:1-19 (July) 1946.
26. Neefe, J. R. and Reinhold, J. G.: Laboratory Aids in the Diagnosis and Management of Infectious (Epidemic) Hepatitis: Analysis of Results Obtained by Studies on 34 Volunteers during the Early and Convalescent Stages of Induced Hepatitis, Gastroenterol. 7:393-413 (Oct.) 1946.
27. Watson, C. J. and Hoffbauer, F. W.: The Problem of Prolonged Hepatitis with Particular Reference to the Cholangiolitic Type and to the Development of Cholangiolitic Cirrhosis of the Liver, Ann. Int. Med. 25:195-227 (Aug.) 1946.

to an earlier viral hepatitis on the other hand urgently needs further clarification.

Still a third group remains, in which the problem is not so much that of continued observation as a general revision of our ideas concerning the nature of the disease. This group is composed of patients who have the clinical pictures of cirrhosis and who give an antecedent history of syphilis and antisyphilitic treatment. In any large group of cases of cirrhosis, a syphilitic background is mentioned in 12 to 25 per cent of the cases. It should be said parenthetically that gummas of the liver have been excluded from these series of cases and also that no improvement in the clinical state of the patients in question followed the use of mercury and iodides. Neither could evidence of chronic arsenical poisoning as such be detected. In Baldridge's often quoted report(28), 12 out of 36 cirrhotic patients had previously received antisyphilitic treatment. In no instance had there been clinical evidence of hepatic disease before treatment was begun, and Baldridge properly argued that treatment was probably responsible in whole or in part for the development of cirrhosis.

What is the nature of the hepatic lesion in this group of cases? It is probably not due to syphilis *per se*, histologic proof at least being completely lacking. It is difficult to attribute the condition to arsenical poisoning except in acute cases. One turns to the experience of certain British venereal clinics during the recent epidemic of viral hepatitis(29) for an explanation. It was there demonstrated that the time interval between the beginning of treatment and the appearance of the so-called late arsphenamine jaundice corresponded to the incubation period (sixty to one hundred and twenty days) of homologous serum jaundice. It was further demonstrated that, when a rigid aseptic technique was established and a separate syringe was used for each patient to avoid any possible transmission of minute quantities of one patient's serum to another, "arsphenamine jaundice" practically disappeared. This is, of course, circumstantial evidence, but it at least indicates two possibilities: (1) that hepatitis of the virus type may be propagated by contaminated syringes in a syphilis treatment center, and (2) that later developments in the nature of chronic atrophy and fibrosis of the liver may be the residues of an artificially transmitted hepatitis. Such residues have been actually demonstrated by aspiration biopsy.

In view of the paragraphs immediately preceding, it seems clear that some space in our etiologic concepts of cirrhosis will have to be allotted to nutritional hepatic injury, alone or in combination with hepatotoxins, and that full consideration must be given to the possibility that viral hepatitis may lay the groundwork for cirrhosis in certain cases, if it does not actually cause it.

## *Some Physiologic Considerations of Certain Symptoms and Signs in Cases of Cirrhosis*

### *Endocrine disturbances*

Within recent years a good deal of attention has been paid to certain biologic aspects of cirrhosis. Among the more recent contributions are those which pertain to associated endocrine disturbances. These may be of more importance than was at first believed, as witness the previously mentioned phenomenon of a rapidly progressive form of cirrhosis which appears in women past the menopause. The observations of Biskind and Biskind(30) on the role of the liver in inactivating estrogens are of interest in this connection, although they obviously do not explain the mechanism of this particular variety of cirrhosis. By placing pellets of either estrogenic or androgenic substances in the spleens of castrated rats, Biskind and Biskind showed that the liver could inactivate these substances completely. If the spleen containing a pellet of an estrogenic substance was transplanted away from the portal venous bed in the castrated animals, the usual estrogenic effect was manifested. In animals with hepatic damage produced by dietary deficiency an exactly similar effect could be produced, even though the pellet-containing spleens were left *in situ;* under

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28. Baldridge, C. W.: The Relationship between Antisyphilitic Treatment and Toxic Cirrhosis, Am. J. M. Sc. 188:675-690 (Nov.) 1934.

29. (a) Bigger, J. W.: Jaundice in Syphilitics under Treatment: Possible Transmission of a Virus, Lancet 1:457-458 (April 10) 1943.
    (b) Darmady, E. M. and Hardwick, C.: Syringe-Transmitted Hepatitis, Lancet 2:106 (July 28) 1945.
    (c) Sheehan, H. L.: Epidemiology of Infective Hepatitis, Lancet 2:8-11 (July 1) 1944.
    (d) Special Articles: Role of Syringes in Transmission of Jaundice: Memorandum by Medical Officers of Ministry of Health, Lancet 2:116-119 (July 28) 1945.

30. Biskind, M. S. and Biskind, G. R.: (a) Diminution in Ability of the Liver to Inactivate Estrone in Vitamin B Complex Deficiency, Science, n.s. 94:462 (Nov. 14) 1941; (b) Effect of Vitamin B Complex Deficiency on Inactivation of Estrone in the Liver, Endocrinology 31:109-114 (July) 1942.

such circumstances the liver apparently lost its power of inactivating the estrogens, and estrus appeared. Inactivation of androgens appears to be less affected by hepatic damage or deficiency of the vitamin-B complex.

The failure of the liver to inactivate estrogens in cases of cirrhosis is clinically demonstrable in certain male patients who present what has been called the Silvestrini-Corda syndrome—lack of bodily hair, eunuchoid build, loss of libido, sterility, testicular atrophy, and gynecomastia. In such patients, Edmondson, Glass and Soll(31) have demonstrated an excessive excretion of total estrogen in the urine, while increased free estrogens were found in some patients with acute hepatic damage who presented similar findings.

Another interesting aspect of the failure of the injured liver to inactive estrogens has been described by Salter(32), who noted gynecomastia in a group of malnourished prisoners of war. Without referring to the details of his report, it seems clear that functional incapacity of the liver in respect to the suppression of estrogenic activity is responsible. Biskind and Biskind(30), in their studies on rats, had shown that even brief periods of thiamine-deprivation were sufficient to allow estrogens to pass the normal hepatic barrier. With an improved diet and presumable improvement in hepatic function, Salter's patients recovered without any permanent residue.

An even more interesting clinical aspect of the estrogenic effect may be seen in connection with those valuable signs of hepatic disease, palmar erythema and nevi araneosi (spiders). It is known that the nevi are in reality small arteriovenous aneurysms, the arterial component of which has about the same histologic structure as the coiled spiral arteries of the endometrium. Bean(33) has demonstrated that these nevi are related to the retention of estrogens and other steroids. They may increase in size and new ones may form when estrogens (stilbestrol, alpha estradiol dipropionate) are given to patients who have cirrhosis. These nevi may appear in the course of prolonged viral hepatitis and disappear as improvement takes place. There is good circumstantial evidence, at least, for regarding the nevi, and the palmar erythema which usually accompanies them, as byproducts of excessive or abnormal estrogenic activity which would ordinarily be suppressed by the liver.

As will appear in later paragraphs, there are other fields in which the capacity of the liver to inactivate normally occurring hormones is in question.

### *The mechanism of ascites*

The commonest single finding leading to the diagnosis of cirrhosis is probably the distention of the abdomen with fluid. The question of how and why ascites forms has been the cause of speculation for more than a century. Portal obstruction and venous stasis were formerly held responsible. In cases of late cirrhosis portal hypertension undoubtedly exists(34), but in cases of acute or early cirrhosis this explanation is hardly tenable. Within recent years changes in the plasma proteins associated with cirrhosis have been studied, and the well-known phenomenon of reversed albumin-globulin ratio has been demonstrated. This finding has led to the belief that the level of albumin, which closely parallels the osmotic pressure, is the principal controlling factor in ascites. Butt, Keys and I(35), however, were unable to correlate observed levels of osmotic pressure in cases of cirrhosis with the presence or absence of ascites, and we found a considerable degree of overlapping in the recorded osmotic pressures of patients who did not have ascites and those who did.

Ralli and her associates(36) studied the matter further and have demonstrated that, among patients whose ascites disappeared under treatment, constant osmotic pressures as well as unchanged figures for serum albumin were observed over a period of months. From this observation they reasoned that factors other than those men-

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31. Edmondson, H. A., Glass, S. J. and Soll, S. N.: Gynecomastia Associated with Cirrhosis of the Liver, Proc. Soc. Exper. Biol. & Med. 42:97-99 (Oct.) 1939.
32. Salter, W.: Gynecomastia in Prisoners of War, unpublished data.
33. Bean, W. B.: (a) A Note on the Development of Cutaneous Arterial "Spiders" and Palmar Erythema in Persons with Liver Disease and Their Development Following the Administration of Estrogens, Am. J. M. Sc. 204:251-253 (Aug.) 1942; (b) Acquired Palmar Erythema and Cutaneous Vascular "Spiders," Am. Heart J. 25:463-477 (April) 1943; (c) Cutaneous Arterial Spider; Survey, Medicine 24:243-331 (Sept.) 1945.
34. Thompson, W. P., Caughey, J. L., Whipple, A. O. and Rousselot, L. M.: Splenic Vein Pressure in Congestive Splenomegaly (Banti's Syndrome), J. Clin. Investigation 16:571-572 (July) 1937.
35. Butt, H. R., Snell, A. M. and Keys, Ancel: Plasma Protein in Hepatic Disease; a Study of the Colloid Osmotic Pressure of Blood Serum and of Ascitic Fluid in Various Diseases of the Liver, Arch. Int. Med. 63:143-155 (Jan.) 1939.
36. Ralli, E. P., Robson, J. S., Clarke, D. and Hoagland, C. L.: Factors Influencing Ascites in Patients with Cirrhosis of the Liver, J. Clin. Investigation 24:316-325 (May) 1945.

tioned earlier in this section of the paper might be involved in retention of water, and they turned to the assay of urine for possible antidiuretic factors. It was found that, when the urine of patients who had ascites was administered to rats, it delayed urinary excretion, while the urine of cirrhotic patients who had never had ascites possessed normal antidiuretic properties. Patients who had previously had ascites but who were free from it at the time of examination occupied an intermediate position in respect to antidiuretic activity. The nature and the source of the antidiuretic substance remain unknown; it is conceivably a product of the hypophysis (pitressin ?), and may well represent another hormonal substance normally inactivated by the liver.

Such an explanation would fit very well with the observation of Labby and Hoagland(37) on alterations of body fluids during the course of acute infectious hepatitis. They found a diminished excretion of water during the acute stages of the disease and an increase of interstitial fluid volume and chloride retention. As the patient improved, excretion of water reached about double its previous level, and the body stores of water diminished. The excretion of urinary chloride increased comparably, and a free diuresis and a fall of body weight took place. It would be difficult to explain changes of the magnitude described on the basis of alteration of plasma proteins or osmotic pressure. The explanation of temporarily unchecked antidiuretic activity is far more in accord with the facts.

No method of applying this information to the field of clinical treatment has appeared as yet.

### *Treatment of Cirrhosis*

It is now the usual practice to treat chronic hepatic disease much as if it were a form of deficiency state. The reasons for this practice are twofold: first, the contribution of nutritional disturbances to the genesis of hepatic cirrhosis is well established; and second, as the disease progresses, it takes on many of the aspects of a multiple deficiency disease. The failure of the damaged liver to carry out the intermediary metabolism of many products necessary for the maintenance of body economy undoubtedly explains this latter situation.

#### *Diet*

Patek(38) in 1936 began the treatment of a group of patients who had alcoholic cirrhosis with a highly nutritious diet and large amounts of vitamin-B complex. The results, which were first reported ten years ago, were most encouraging, and have since been confirmed by investigators in many parts of the country. Details of the diets now in use have been modified according to the preference of the investigator. The original Patek diet contained 365 Gm. of carbohydrate, 139 Gm. of protein, and 175 Gm. of fat; it was made up largely of meat, milk, eggs, fruit and green vegetables, and was heavily supplemented with brewers' yeast, thiamine hydrochloride, and injectable liver extract. At the Mayo Clinic a somewhat similar diet containing approximately 500 Gm. of carbohydrate, 110 Gm. of protein and 60 Gm. of fat, has been employed.

These diets have been modified by many workers, but the ultimate results reported are essentially the same. It seems fair, therefore, to assume that the essentials of the program are an adequate and palatable diet rich in carbohydrate and protein and heavily supplemented by natural and artificial sources of the vitamin-B complex, notably yeast and liver. The tendency has been toward liberalization of the diet and the rather generous use of fat, previously considered as harmful.

Recent studies from the Rockefeller Institute(39) have in fact shown that patients who have infectious hepatitis do better on a liberal fat intake than those receiving only minimal quantities. The fat allowed was chiefly that contained in milk, butter and eggs, or in boiled or baked animal protein.

#### *Supplementary measures*

Among supplementary measures used in the treatment of chronic hepatic disease are the lipotropic agents, methionine and choline. They appear not to exercise any particular influence in the course of infectious hepatitis. Neither is there satisfactory evi-

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37. Labby, D. H. and Hoagland, C. L.: Alterations in Body Fluids during Acute Infectious Hepatitis, Proc. Soc. Exper. Biol. & Med. 63:110-114 (Oct.) 1946.

38. Patek, A. J., Jr.: Treatment of Alcoholic Cirrhosis of Liver with High Vitamin Therapy, Proc. Soc. Exper. Biol. & Med. 37:329-330 (Nov.) 1937.

39. Hoagland, C. L., Labby, D. H., Kunkel, H. G. and Shank, R. E.: An Analysis of the Effect of Fat in the Diet on Recovery in Infectious Hepatitis, Am. J. Pub. Health 36: 1287-1293 (Nov.) 1946.

dence to indicate that their use is necessary in certain of the more chronic forms of hepatic disease. There may be some advantage in using these substances in treating the large and presumably fatty livers of alcoholic patients(40), and there are some reports to suggest their value in severe degrees of hepatic insufficiency(41). Choline is readily obtainable and may be used orally in doses of 4 to 6 Gm. daily(42). Methionine in the pure form is at present difficult to obtain, but it occurs in satisfactory concentrations in many casein hydrolysates. Further study will be required to establish the place of these lipotropic agents in treatment.

The use of liver extract as a supplement to the diet of cirrhotic patients has been mentioned. There is little evidence that enough is absorbed or utilized when taken by mouth to affect the macrocytic anemia of hepatic disease; its parenteral use has been only slightly more encouraging. Recently a preparation of liver extract especially developed for intravenous administration has been used at the Rockefeller Institute. It has been employed in cases of chronic hepatitis and cirrhosis, the usual practice being to give gradually increasing doses at one-day intervals, until a maximal dose of 10 cc. is reached. This amount may be continued two or three times weekly for an indefinite period. General experience with this material has been small, but recent observations(43) seem to encourage its further use. My personal experience with it has not been sufficient to warrant an opinion.

The low levels of serum albumin in cases of cirrhosis, and the resulting decrease of the osmotic pressure of cirrhotic plasma have induced many clinical investigators to give various substances parenterally in the hope of altering or controlling the transudation of peritoneal fluid. Solution of acacia and ascitic fluid have failed to achieve any spectacular effects; plasma itself in large doses has been helpful only temporarily, as is the case with whole blood. With the development of salt-poor concentrated human serum albumin, better results were naturally expected; unfortunately, however, little of the material has been available except for investigative purposes. By using large doses the Rockefeller group have produced copious diuresis and relief of ascites in some cases, and have been able to maintain serum albumin at a nearly normal level(44).

Thorn and his associates(45) have provided more detailed information in regard to the use of albumin in their recent report. Its use in single or multiple doses of 50 Gm. produced striking increases of urinary volume and a satisfactory increase of serum albumin in cases of cirrhosis. The loss of weight was less than expected. The treated subject retained considerable quantities of albumin; there were only small losses in the urine, and a slow equilibrium was attained between ascitic and plasma levels of albumin. Thorn and his associates recommend the use of albumin in cases of severe cirrhosis, in which the patient cannot maintain a positive nitrogen balance and increase his serum albumin on dietary treatment alone, and in cases of long-continued hepatitis, in which anorexia interferes with a normal dietary intake and a positive nitrogen balance cannot therefore be attained. These encouraging reports should stimulate a further clinical use of albumin when it becomes more generally available.

The other accessory therapeutic measures which have been suggested will not be discussed here; it suffices to say with the Rockefeller investigators(43) that adjuvant therapy of the most diverse types may be employed, and that any measure which may relieve one or more of the metabolic defects arising in the complicated picture of hepatic insufficiency should be employed in treatment.

### *Results of Treatment*

Space does not permit a detailed discussion of the available figures covering results of treatment, but, in general, the results have by far exceeded expectations. Patients who had proved cirrhosis now have carried on successfully for as long as eight years. The mortality rate from the disease during the first year after the appearance of ascites continues to be high, but it is still vastly less in

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40. Beams, A. J.: The Treatment of Cirrhosis of the Liver with Choline and Cystine, J.A.M.A. 130:190-194 (Jan. 26) 1946.
41. MacCallum, F. O.: Homologous Serum Hepatitis, Proc. Roy. Soc. Med. 39:655-657 (Aug.) 1946.
42. Russakoff, A. H. and Blumberg, H.: Choline as an Adjuvant to the Dietary Therapy of Cirrhosis of the Liver, Ann. Int. Med. 21:848-862 (Nov.) 1944.
43. Hoagland, C. L., Kunkel, H. G., Labby, D. H. and Shank, R. E.: Therapy of Infectious Hepatitis, Bu. Med. News Letter 7:8-13 (May 24) 1946.
44. Labby, D.: Personal communication to the author.
45. Thorn, G. W., Armstrong, S. H., Jr. and Davenport, V. D.: Chemical, Clinical, and Immunological Studies on the Products of Human Plasma Fractionation. XXXI. The Use of Salt-Poor Concentrated Human Serum Albumin Solution in the Treatment of Hepatic Cirrhosis, J. Clin. Investigation 25:304-323 (May) 1946.

the treated group than in control groups. Patek(46) reported that 45 per cent of his patients have survived for two years, and Fleming and I(47) have a substantial group of cases of arrested cirrhosis in which the survival period was more than two years. A few cases have been recorded in which loss of ascites, edema and jaundice has occurred several times as a result of dietary treatment. As Patek has noted, these successive responses in the same patient "give added significance and dignity to the cause of dietetic therapy."

Because the disease affects principally persons in the older age groups and also because of the unpredictable behavior of the alcoholic patients who make up a sizable proportion of the group under consideration, the long-range prognosis is not particularly good. It is an extremely difficult matter to make many of these patients follow the prescribed diet, and the sicker patients require the best of nursing and dietetic care. With patience and persistence, however, much may be accomplished. It is obvious that, as a rule, the disease is detected only in its latest stages and that much earlier diagnosis will be required if the current figures of mortality and morbidity are to be greatly improved(46). The groups in which dietetic treatment can perhaps be employed to best advantage are the younger alcoholic patients whose portal circulation has not been too greatly reduced by periportal fibrosis, those rare patients who may be suffering from a purely nutritional type of injury, and those who are suffering from the residues of previous infectious hepatitis. Greater familiarity with the less obvious signs of hepatic injury, more general use of the various hepatic functional tests, and a high index of suspicion in regard to the residual hepatic damage produced by other illnesses may be expected to reduce greatly the mortality and morbidity of the more chronic forms of hepatic disease.

16. Patek, A. J., Jr.: Dietary Treatment of Laennec's Cirrhosis with Special Reference to Early Stages of the Disease, Bu'l. New York Acad. Med., s. 2, 19:498-506 (July) 1943.
17. Fleming, R. G. and Snell, A. M.: Portal Cirrhosis with Ascites: an Analysis of 200 Cases with Special Reference to Prognosis and Treatment, Am. J. Digest. Dis. 9:115-120 (April) 1942.

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**To paraphrase Winston Churchill's comment on English socialism**, the American people under free and democratic medicine have shared somewhat unequally in the best medical service in the world; under socialized medicine they would share equally in the worst.—B. R. Kirklin: The Outlook for Postwar Medicine as Seen by a Radiologist, Minnesota Med. 29:897 (Sept.) 1946.

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# PERITENDINITIS OF THE EXTENSOR POLLICIS BREVIS AND ABDUCTOR POLLICIS LONGUS TENDONS— De QUERVAIN'S DISEASE

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*and*
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In 1895, De Quervain(1) described a painful affection of the extensor pollicis brevis and abductor pollicis longus tendons at the radial styloid region of the wrist. He attributed the symptoms to a post-traumatic stenosing tenosynovitis. Although De Quervain's article was apparently the first to appear in the literature, the following passage appeared in the thirteenth edition of Gray's ANATOMY, published in 1893(2): "The tendons of the extensor muscles of the thumb are liable to become strained and the sheath inflamed, after excessive exercise, producing a sausage-shaped swelling along the course of the tendon, and giving rise to a crackling sensation to the finger."

In the few articles on this subject that have appeared in the literature(3), the consensus of opinion has been that a stenosing tenosynovitis is the primary pathologic pro-

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1. De Quervain, H.: Ueber eine Form von chronischer Tendovaginitis, Cor.-Bl. f. schweiz. Aerzte, Basel, 25:389-394, 1895.
2. Gray, Henry: Anatomy, Descriptive and Surgical, ed. 13, Philadelphia, Lea Bros. & Co., 1893.
3. (a) Brown, W. M.: Stenosing Tendovaginitis at the Radial Styloid; Brief Review of Some of the Literature with Report of a Case, Brit. M. J. 2:538-539 (Sept. 21) 1935.
   (b) Burns, B. H., and Ellis, V. H.: Stenosing Tendovaginitis at the Radial Styloid Process, Lancet 1:717-718 (March 28) 1936.
   (c) Compere, E. L.: Bilateral Snapping Thumbs, Ann. Surg. 97:773-777 (May) 1933.
   (d) Finkelstein, H.: Stenosing Tendovaginitis at Radial Styloid Process, J. Bone & Joint Surg. 12:509-540 (July) 1930.
   (e) Hoffmann, P.: Stenosing Tendovaginitis at Radial Styloid Process, J. Bone & Joint Surg. 13:89-90 (Jan.) 1931.
   (f) Patterson, D. C.: De Quervain's Disease: Stenosing Tendovaginitis at the Radial Styloid, New England J. Med. 214:101-103 (Jan. 16) 1936.
   (g) Patterson, D. C., and Jones. E. K.: De Quervain's Disease; Stenosing Tendovaginitis at Radial Styloid, Am. J. Surg. 67:296-301 (Feb.) 1945.
   (h) Potter, P. C.: Stenosing Tendovaginitis at Radial Styloid (DeQuervain's Disease), Ann. Surg. 117:290-296 (Feb.) 1943.
   (i) Schneider, C. C.: Stenosing Fibrous Tendovaginitis over Radial Styloid (De Quervain), Surg., Gynec., & Obst. 46:846-850 (June) 1928.
   (j) Watkins, J. T., and Pitkin, H. C.: Stenosing Tendovaginitis of De Quervain; Report of a Case, California and West. Med. 32: 101-102 (Feb.) 1930.
   (k) Wood, C. F.: Stenosing Tendovaginitis at Radial Styloid Process, South. Surgeon, 10:105-110 (Feb.) 1941.
   (l) Zelle, O. L., and Schnepp, K. H.: Snapping Thumb: Tendovaginitis Stenosans, Am. J. Surg. 33:321-322 (Aug.) 1936.

cess. This concept is not in exact accord with the findings observed in those cases seen at Duke Hospital. The observations made here indicate that the primary pathologic process is a hypertrophic traumatic peritendinitis of the extensor pollicis brevis and abductor pollicis longus tendons, and that the symptoms arise from the attempted to-and-fro movement of the inflamed and swollen tendons beneath the overlying normal dorsal carpal ligament.

### *Anatomy*

The dorsal carpal ligament crosses the dorsum of the wrist in a transverse and slightly oblique direction. It extends from the lateral aspect of the distal end of the radius and its styloid process medially and proximally to the ulna and ulnar border of the carpus. Septal processes originating on its undersurface extend downward and insert on the radius and ulna, thus forming separate osteo-fascial tunnels for the extensor tendons and their synovial sheaths. The most lateral of these compartments contains the extensor pollicis brevis and abductor pollicis longus tendons and their common sheath. The extensor tendon is the more superficial of the two, forming the lateral border of the anatomic snuff-box; the abductor longus tendon is deep and volar to it. Their common sheath invests these tendons for a distance from one inch above the proximal border of the dorsal carpal ligament to one inch below the distal border of the ligament. The ligament transects the tendons, and, because of its inelasticity, does not yield to any enlargement of the tendons as it attempts to pass under the ligament in either direction.

### *Mechanism of Injury*

The tendons are tautened to their fullest extent when the thumb is in the position of maximum opposition. When, in addition, the hand is placed in the position of ulnar deviation, the tendons are overstretched and impinged over the prominence of the radial styloid. When the tendons are tautened in forceful extension and abduction of the thumb, they strain laterally against the confining dorsal carpal ligament, and may produce sufficient friction to cause an inflammatory reaction. The pain is readily demonstrated by forcible ulnar deviation of the hand with the flexed, adducted thumb grasped tightly in the other four fingers, and is relieved when the thumb is released, despite maintained ulnar deviation of the wrist. The production and relief of excruciating pain by this maneuver are considered a pathognomonic sign of De Quervain's disease. The pain thus produced is accounted for by the fact that the area of peritendinitis proximal to the dorsal carpal ligament is drawn against the unyielding proximal border of the ligament. Another test, which elicits the same pain, involves forceful extension of the thumb. This draws the area of peritendinitis distal to the dorsal carpal ligament against the distal border of the ligament.

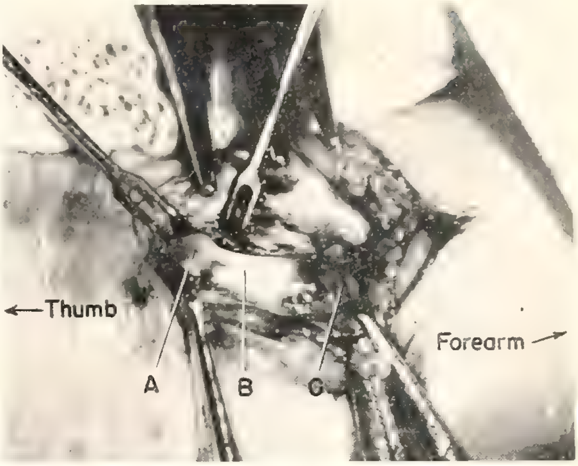

**Fig. 1. Photograph showing the exposed extensor pollicis brevis and abductor pollicis longus tendons, with the incised dorsal carpal ligament and the common tendon sheath retracted. A indicates the distal peritendinous enlargement; C, the proximal peritendinous enlargement; and B, the intervening section of uninvolved tendon which the dorsal carpal ligament overlies.**

### *Pathogenesis*

An inflammatory reaction can be set up by either of these two mechanisms, involving those portions of the tendons immediately proximal and distal to the dorsal carpal ligament. The inflammatory reaction usually comes on insidiously as the result of prolonged, repeated, or strenuous use of the thumb and wrist. It may come on abruptly, however, as the result of sudden injury. The acute phase may subside without any residual disability, but, as a rule, peritendinous hyperplasia and fibrosis develop, and the symptoms persist despite prolonged and heroic conservative therapy. The hyperplasia and fibrosis result in cone-shaped enlargements of the peritenon proximal and distal to the dorsal carpal ligament, the bases of the cones being adjacent to the margins of the ligament. These enlargements produce a disparity between the circumference of the tendons and the caliber of the intervening osteo-fascial tunnel. Thus any motion entailing forceful flexion or extension of the thumb will tend to force one of these enlargements against the unyielding dorsal carpal ligament, and will induce pain.

The majority of the cases reported in the literature occurred in women as the result of domestic or occupational tasks requiring repetitive movements of the wrist in ulnar deviation with the thumb fixed in opposition. Early in the century, the syndrome was known as "washerwoman's strain" because of the frequency of cases occurring after the prolonged wringing of clothes. With the recent influx of women in industry there has been an increase in the incidence of De Quervain's disease. This increase has been greatest in the textile industries and hosiery districts.

### *Symptoms*

Pain over the radial styloid which may extend a few centimeters up the forearm and down along the dorsum of the thumb is the outstanding symptom. The patient frequently remarks about the paradoxical nature of the pain. Certain gross, forceful movements of the hand may be executed painlessly, whereas other minor movements of the hand, such as those involved in pouring water from a pitcher or lifting a cup to drink, are excruciatingly painful. Analysis of these latter movements makes the cause of the pain obvious.

There is tenderness to pressure over the involved areas of the tendons, and frequently the anatomic snuff-box is obliterated by the distal enlargement.

### *Diagnosis*

The diagnosis is relatively simple if one is aware of the condition and its pathogenesis. Arthritis, wrist sprain, ganglion, periostitis, tuberculous tenosynovitis, and neuritis are some of the most frequent erroneous diagnoses.

### *Treatment*

Surgery is the treatment of choice. It consists in section of the dorsal carpal ligament where it overlies the involved tendons. It is best done under local anesthesia, and is uniformly successful. No immobilization is necessary, and active motion may be resumed immediately.

### *Summary*

De Quervain's disease is a hypertrophic traumatic peritendinitis of the extensor pollicis brevis and abductor pollicis longus tendons proximal and distal to the dorsal carpal ligament. The diagnosis is simple. Surgery is the treatment of choice.

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## PRESENT TRENDS IN THE TREATMENT OF SYPHILIS

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The treatment of syphilis has been in a state of flux ever since Ehrlich's introduction of arsphenamine in 1910. The rate of change of the methods in vogue has varied; from Ehrlich's massive "one-injection cure," treatment plans progressed through a number of modifications which employed varying combinations of arsphenamine ("606"), neoarsphenamine, mercury, bismuth, and potassium iodide. Fifteen years ago it was not difficult to present several rather standardized treatment programs for the various stages of syphilis, each program based on the experiences of the cooperative clinical groups. During the past few years, however, with the introduction of mapharsen (oxophenarsine hydrochloride) and the "rapid treatment" regimens, and particularly since the introduction of penicillin, the rate of change in plans of treatment begins to approach the speed of jet-propelled airplanes!

Some people would say, off hand, that one could discuss the subject of this paper with a single word—namely, penicillin. It appears to them that the treatment of syphilis is now very simple; they believe that one has only to give every patient with a positive serologic test an "intensive course of penicillin," and consider the matter closed. The indulgence of this attitude, without a

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careful evaluation of each individual's infection, will lead to serious errors, failures, and treatment tragedies.

It is also true that the questions, "How much penicillin shall I use?", "How often shall I give it?", and "How long a period of time shall I continue its administration?" have not yet been satisfactorily answered. As a matter of fact, the treatment of syphilis today is probably a more confused subject than it has been at any time during the past twenty years. The important *fact* to bear in mind is that the appraisal of penicillin is still going on and must be carried on for at least ten years before the real value of this remedy in the treatment of syphilis will be known.

### *Experimental Observations*

Since penicillin is by far the most promising new therapeutic agent, I should like briefly to review some of the significant research pertaining to its effect on experimental syphilis produced in rabbits. The discovery that penicillin is produced in four or more different species, called—at present—F, G, K, and X, led at once to an evaluation of the effect of each type on various pathogenic micro-organisms(1). It was soon learned that penicillin G is the most potent destroyer of the Spirochaeta pallida. The comparative spirocheticidal activity of the four species is shown in table 1 (Eagle(2)).

**Table 1**

**The comparative spirocheticidal activity (in vitro) of four species of penicillin (from Eagle(2))**

| Penicillin type | Average activity (crystalline)* |
|---|---|
| F | 53 |
| G | 100 |
| K | 76 |
| X | 51 |

* All values have been referred to that of G as 100.

Using sodium penicillin in aqueous solution, Eagle, Magnuson and Fleischman(3) then demonstrated that in the treatment of syphilitic rabbits (1) the total curative dose of penicillin was inversely proportionate to the *number* of injections (fig. 1); (2) the *interval* between injections also had an influence on the total curative dose (fig. 2); and (3) "low concentrations of penicillin acting over a long period of time (i.e. many small injections) were more effective than high concentrations acting over a short period (i.e. a few large injections to the same total dose)."(3)

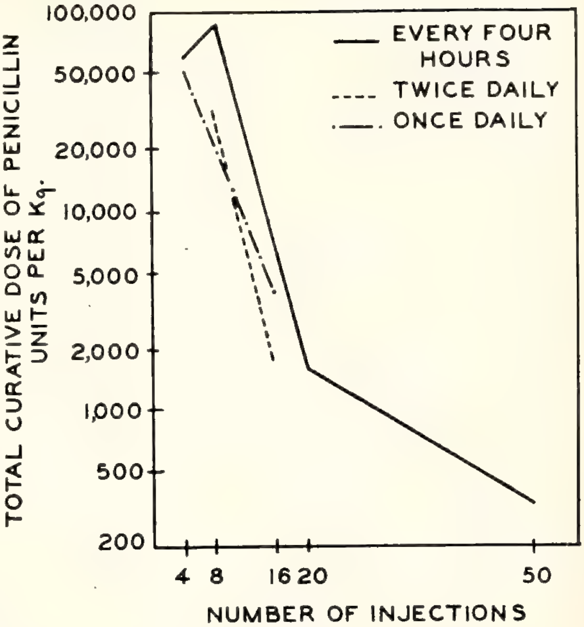

**Fig. 1. The units of the abscissa represent the number of injections. This graph demonstrates that the total amount of penicillin required to bring about a cure can be decreased simply by using a greater number of injections. (From Eagle, Magnuson, & Fleischman(3))**

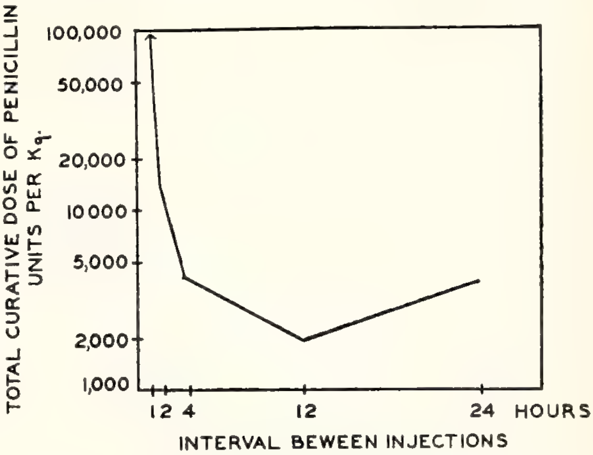

**Fig. 2. The units of the abscissa represent the number of hours between injections (with a fixed total number of injections). A twelve-hour interval brought about cure with the smallest amount of penicillin. (From Eagle, Magnuson, & Fleischman(3))**

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1. Reynolds, F. W., and Moore, J. E.: Syphilis: A Review of the Recent Literature, Arch. Int. Med. 78:733-769 (Dec.) 1946.
2. Eagle, H.: Relative Activity of Penicillins F, G, K, and X against Spirochetes and Streptococci in vitro, J. Bacteriol. 52:81-88 (July) 1946.
3. Eagle, H., Magnuson, H. J., and Fleischman, R.: The Effect of the Method of Administration on the Therapeutic Efficacy of Sodium Penicillin in Experimental Syphilis, Bull. Johns Hopkins Hosp. 79:168-189 (Aug.) 1946.

Eagle and his group concluded that the mode of action of penicillin differs in several respects from that of arsenicals. When mapharsen, for example, is injected into the blood, it is supposedly bound by the organisms in competition with the tissues in a relatively short time, so that a single exposure to a very high concentration of the arsenical apparently kills as many organisms as repeated exposures to small concentrations. On that basis, the curative dose of mapharsen in a patient with syphilis is essentially the same, whether the drug is given in a single massive injection or in a number of smaller injections over a long period of time. The therapeutic efficacy of penicillin, on the other hand, is greatly *increased* merely by subdividing the treatment into a large number of injections. These investigators believe that the essential difference is that penicillin is not bound and concentrated by the organisms, so that "its action depends on the *length of time* for which effectively spirocheticidal levels are maintained in the body fluids. It is this introduction of the time factor, the necessity for maintaining an effective level, which primarily distinguishes the kinetics of the spirocheticidal action of penicillin from that of e.g. mapharsen."(3)

There appear to be, then, two main factors governing the therapeutic efficacy of penicillin in syphilis: first, its concentration in the body fluids; second, the period of time during which the organisms are exposed to an effective concentration. Many investigators now believe that the second of these factors is the more important. This belief led Romansky and Rittman(4) to search for a vehicle for penicillin which would delay its absorption and thereby maintain an effective blood level for a longer period of time.

Another question frequently asked is: "Will the spirochete develop penicillin-resistant strains?" Tung and Frazier(5) studied this problem with the aid of an electron microscope. Using the Reiter strain of spirochete (an experimental animal strain grown in thioglycollate with the addition of rabbit serum), they found that "this strain did not develop an increased tolerance to penicillin after being subjected to 15 consecutive passages through media containing penicillin." Their spirochetes did show elongation, inhibition of cellular division, and loss of flagella. The final answer to this question must await further study and clinical observation.

In order to compare the spirocheticidal effect of penicillin with that of mapharsen in rabbits and in human beings, Eagle, Magnuson, and Fleischman formulated this ratio: milligram for milligram, penicillin is *two* to *four* times as effective as mapharsen in man, but *ten* to *twenty* times as effective as mapharsen in rabbits. To cure the syphilis, they found that less than one twentieth to one fortieth as much penicillin (per kilogram) is required in rabbits as in human beings. This finding shows that the host factor modifies not only the biology of the infection, but the efficacy of the therapeutic agent.

Many investigators believe there is a true synergistic effect between mapharsen and penicillin, and between bismuth and penicillin. Eagle and his coworkers(6) reported that a *sub*curative dose of penicillin combined with a *sub*curative dose of mapharsen will cure syphilis in rabbits. They stated that as little as one tenth of the curative dose of penicillin, properly distributed in time, kills most of the spirochetes in the infected animal; the *bulk* of the penicillin, therefore, is devoted to the eradication of a small number of relatively virulent organisms. The few organisms which are resistant either to penicillin or to arsenic, and which would survive a subcurative dose of one of these agents, are probably normally susceptible to the other drug, which has a different mode of action. These are killed, then, by the subcurative dose of the second drug. (For example: a subcurative dose of drug A, which kills more than 99 per cent of the organisms, superimposed on a subcurative dose of drug B, which alone would also kill 99 per cent of the organisms, would bring about a biologic sterilization.)

Applying this finding to human syphilis, one would expect that a subcurative amount of penicillin, supplemented (simultaneously)

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4. Romansky, M. J., and Rittman, G. E.: Penicillin: Prolonged Action in Beeswax Peanut Oil Mixtures: Single Injection Treatment of Gonorrhea. Bull. U. S. Army M. Dept. (no. 81) pp. 43-49 (Oct.) 1944.
5. Tung, T., and Frazier, C. N.: Penicillin Sensitivity and Morphology of the Reiter Strain of Treponema Pallidum after Cultivation in Media Containing Penicillin. Am. J. Syph., Gonor. & Ven. Dis. 30:205-210 (May) 1946.
6. Eagle, H., Magnuson, H. J., and Fleischman, R.: Synergistic Action of Penicillin and Mapharsen (Oxophenarsine Hydrochloride) in the Treatment of Experimental Syphilis, J. Ven. Dis. Inform. 27:3-9 (Jan.) 1946.

by a subcurative dose of mapharsen, would result in a lower failure rate than would be obtained by simply increasing the amount of penicillin used. More than two years ago, O'Leary and Kierland, alarmed by the high percentage of failures in early syphilis treated with penicillin alone, amplified their treatment schemes by the addition of arsenoxide and bismuth(7). The specific amounts of mapharsen and penicillin required to bring about a cure by this method have not yet been established clinically, but preliminary reports indicate that this is a promising approach. Citing the experiences in sixteen rapid treatment centers operated by the U.S. Public Health Service, Heller(8) reported that a treatment schedule employing 1,200,000 units of penicillin, plus five injections of arsenoxide, resulted in a failure rate of 13 per cent (ten months' follow-up). This rate was reduced to 8 per cent by the addition of 600 mg. of bismuth to the above schedule. He stated that the 5-12-3 schedule (5 injections of arsenoxide, totalling 320 mg.; 1.2 million units of penicillin; and 3 injections of bismuth, totalling 600 mg.) gave better results than any other schedule employing penicillin which had been tried up to that time.

### *Clinical Observations*

Enthusiasm about the use of penicillin has become universal; many share the opinion of Pillsbury, who stated that "penicillin therapy is decidedly superior to any previous form of treatment in respect to non-toxicity, completion of therapy within a prescribed period, healing of early lesions, and control of infectiousness. On only one score was penicillin inferior to intensive arsenobismuth therapy, i.e., the incidence of persistent seropositivity six or more months after treatment."(9) The number of clinical reports in the current literature is overwhelming, and one is soon confused and bewildered by trying to find comparative results.

Eagle has pointed out that the main disadvantage in using penicillin is that "you are pouring it more or less into a bucket which has a big hole in the bottom, represented by its rapid rate of excretion."(10) Studies in man have shown that, at the end of the first hour following the injection of an aqueous solution, 70 per cent of penicillin G and X is recoverable in the urine; 85 per cent is recoverable in three hours. The level of penicillin in the blood decreases at the approximate rate of 80 per cent per hour. The use of penicillin in oil and beeswax overcomes this disadvantage more successfully than any other plan to date.

Several investigators have concluded that the use of penicillin in its most advantageous manner may not be able to bring about cures in more than 85 per cent of the cases, because of the limiting factors: (a) variation in the susceptibility of different strains of the spirochete, and (b) variability in the resistance of the patient.

In regard to the interval between injections for hospitalized patients (using an aqueous solution of penicillin G), agreement has not yet been reached as to whether a two-hour interval is better than a three-hour schedule. Mahoney(10) favors a two-hour interval, using 40,000 units per intramuscular injection for a total of 85 injections (3,400,000 units in seven days). His results in 174 cases of early syphilis, followed for six to twelve months, are impressive: only 6 had to be retreated, although it is possible that more failures occurred later. He also noted that it might take a year to achieve seronegativity with this plan. The present routine treatment plan for early syphilis in the rapid treatment centers (U. S. Public Health Service) includes 5 injections of mapharsen, 1,800,000 units of penicillin, given at the rate of 16,666 units every two hours, and 3 injections of bismuth; this plan requires nine days, and according to Wile(10), the results have been very satisfactory for a hospital plan.

Since most of us are interested primarily in treatment plans which may be carried out in the office, let us consider the results reported with the use of penicillin in oil and beeswax ("POB"). The "Romansky formula" is 300,000 units of calcium penicillin in 4.8 per cent by weight of bleached beeswax, contained in 1 cc. of peanut oil. Romansky and Rein's first series included 75 patients

7. O'Leary, P. A., and Kierland, R. R.: Today's Treatment of Syphilis, J.A.M.A. 132:430-434 (Oct. 26) 1946.
8. Heller, J. R., Jr.: Results of Rapid Treatment of Early Syphilis. J.A.M.A. 132:258-263 (Oct. 5) 1946.
9. Pillsbury, D. M.: Penicillin Therapy of Early Syphilis in 14,000 Patients: Follow-Up Examination of 792 Patients Six Months or More After Treatment, Am. J. Syph., Gonor. & Ven. Dis. 30:134-143 (March) 1946, quoted by Reynolds and Moore(1).
10. Symposium on Syphilis, Am. Acad. of Derm. & Syph., Cleveland, Dec. 11, 1946.

with early syphilis who were given one intramuscular injection of this formula daily for eight days (2,400,000 units); of the 60 patients followed, 2 were treatment failures and 2 more became reinfected(11). Romansky is now advocating one injection (or two, if possible) daily for sixteen days, because their results indicate that the duration of time over which penicillin is administered by this method is more important than the amount of the drug given.

The report of Thomas, Landy, and Cooper describing their results in the treatment of 802 patients with POB at the Rapid Treatment Center, Bellevue Hospital, New York, has just become available(12). (This is, I believe, the largest series reported to date in this country.) These patients all had early infectious syphilis and were given 600,000 units of POB per day (in one or two injections) for eight days (4,800,000 units). No serious reactions were encountered: 5.1 per cent had pain and induration at the sites of injections only; 9.6 per cent had low-grade fever on the fifth to seventh day, associated with pain and induration at the sites of injections; 1.1 per cent had urticaria accompanied by low-grade fever. Several of the last mentioned group also had angioneurotic edema, lasting not more than five days. The rate of relapses and reinfections ranged from 6.8 per cent in the seronegative primary cases to 15.2 per cent in the secondary group; most of these relapses and reinfections occurred within six months after treatment. It was found that patients were frequently reinfected by sexual partners whom they had previously infected. The group treated with two injections a day did not show better results than those who received only one injection daily.

Romansky has shown that a single injection of calcium POB maintains an effective blood level for at least twenty hours, and continues to be excreted in the urine for as long as three days. He believes that, because of its prolonged action, there is an actual therapeutic advantage in treating syphilis with penicillin in beeswax and oil, rather than in aqueous solutions.

### *Treatment Plan for Office Use*

In the midst of the present confusion about the treatment of syphilis, one should be guided by some of the well established landmarks which have stood the test of time. We do not have as yet, even with penicillin, a method by which we can determine exactly how much treatment any individual will require for a "cure." The intelligent application of any method of treatment to a person infected with syphilis still requires a careful evaluation of that patient's particular needs and of what he can be expected to tolerate. The basic factors in this evaluation have been enumerated by Wile; they are:

1. Age of the patient.
2. Duration of the syphilis.
3. Stage of the infection (type).
4. Presence of other disease.
5. Social and economic status.

These factors are self-explanatory and require no detailed discussion. The patient's age, the duration and stage of his syphilis, and the presence of visceral or central nervous system involvement are guides in determining how intensive a regimen he requires and how he may tolerate it; the presence of some other disease may modify the choice of treatment, and in some cases the "other disease" may be relatively more important at the time than is the syphilis. Social and economic factors should be considered in discussing the whole matter with the patient, with at least two objectives in mind: to render the person non-infectious as soon as possible, and to arrange that treatment will not be such a financial burden that it may not be completed.

One should bear in mind that there is no "time-tested" plan employing penicillin in oil and wax. All available evidence indicates that penicillin should probably be included in any treatment plan for early syphilis; the beeswax and oil preparation is the most suitable for office use. I believe that some mapharsen and some bismuth should be given with it. The following schedule is offered on this basis, and with the reminder that individual modifications should be made when indicated. (The spinal fluid should be examined, in every case, sometime within the first six months.)

11. Romansky, M. J., and Rein, C. R.: Treatment of Early Syphilis with Calcium Penicillin-Oil-Beeswax, J.A.M.A. 132: 847-851 (Dec. 7) 1946.
12. Thomas, E. W., Landy, S., and Cooper, C.: Rapid Treatment of Early Syphilis with Penicillin in Beeswax and Oil, J. Ven. Dis. Inform. 28:19-23 (Feb.) 1947.

**Table 2**

**Treatment Plan Suggested for the Office Treatment of Patients with Early Syphilis**

| | |
|---|---|
| Penicillin in oil and beeswax | One injection (300,000 units) daily for ten days |
| Mapharsen | One injection (40-60 mg.) every third day for a total of 3, or preferably 6, injections; begun concomitantly with the POB. |
| Bismuth subsalicylate in oil | One injection every seven days following POB, for a total of 10, or preferably 20, injections. |
| Serologic follow-up (quantitative) | Once a month for six months; then every three months for one year. |

If the serologic titer falls satisfactorily for a while and then starts to rise, it is advisable to repeat the course of penicillin. This schedule is not applicable to all stages of syphilis. In patients with neurosyphilis, for example, adequate "preparation" with bismuth and potassium iodide may avoid a serious reaction; it is sometimes advisable to repeat the penicillin course (which should be longer than the one described above) every three or six months according to the progress of the patient. Fever therapy can often be advantageously combined with penicillin in neurosyphilis, and in some types of congenital syphilis (with interstitial keratitis).(13) Cardiovascular and visceral involvement require careful study and usually respond better to a conservative initiation of therapy by bismuth alone. It is advisable to prepare patients with latent syphilis, who may have no clinically active lesion, with at least six injections of bismuth before starting the penicillin; one may thus avoid a serious Herxheimer reaction which might otherwise be precipitated by the stirring up of an obscure focus.

The pregnant woman with syphilis appears to be an ideal subject for treatment with penicillin. The administration of 2,400,000 units in eight days (as a hospital procedure) during the third month and again during the seventh month has been recommended by O'Leary and Kierland(7), who state that penicillin is more effective in the prevention of congenital syphilis than it is in its treatment. As an office procedure, the schedule proposed in table 2 should be satisfactory in a majority of cases.

### *Treatment Reactions*

The Herxheimer reaction is an accentuation of previously existing symptoms, usually accompanied by fever; it may "bring out" a secondary eruption. It is not a contraindication to further treatment in early, uncomplicated syphilis, but it may be serious if it involves the brain, spinal cord, larynx, or other vital organs. Penicillin is just as capable of evoking this reaction as are the arsenicals. Romansky and Rein(11) reported such reactions in 39 per cent of their series; Heller(8) noted an incidence up to 90 per cent.

According to Romansky, specific local and systemic reactions to penicillin in oil and beeswax occur in 5 to 10 per cent of the patients treated. POB is capable of producing a severe local tissue reaction sometimes resembling a sterile abscess. Some observers state that this reaction is an urticarial wheal in the muscle tissue due to an allergic response; they advise treatment with *cold* packs locally and benadryl (or pyribenzamine) systemically. The technique of the injection is important; the following suggestions may be helpful in preventing these reactions: (1) keep the POB at room temperature; (2) be sure that the needle is carried well beyond the subcutaneous layer into muscle tissue; (3) be sure the needle is not in a blood vessel; (4) express *all* of the material through the needle before withdrawing it; (5) do not massage the site of injection.

Allergic manifestations resulting from the administration of penicillin have been summarized by Reynolds and Moore(1) as follows: "(1) urticaria or angioneurotic edema; (2) papular, vesicular, or bullous eruptions, sometimes followed by desquamation; (3) contact dermatitis; (4) an Arthus type of response following repeated sensitivity of the skin, and (6) delayed reactions similar to serum sickness." Morginson has discussed these reactions in detail(14). It is also known that penicillin may activate a quiescent focus of fungus infection on the hands or feet.

There are several possible sources of allergens in POB: the penicillin fungus, substances used in the preparation of penicillin, possibly "impurities" in the amorphous

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13. Reynolds, F. W., and Moore, J. E.: Syphilis: A Review of the Recent Literature, Arch. Int. Med. 79:92-112 (Jan.) 1947.

14. Morginson, W. J.: Toxic Reactions Accompanying Penicillin Therapy, J.A.M.A. 132:915 919 (Dec. 14) 1946.

preparations, the penicillin itself, the beeswax, and the peanut oil. (Sulzburger(11) pointed out that beeswax may vary considerably in its composition, and may contain at times traces of such allergenic substances as ragweed.)

Crystalline salts of penicillin in oil and beeswax are now commercially available and may be expected to cause considerably fewer allergic reactions. The recommended treatment for these reactions is the prompt use of large amounts of benadryl or pyribenzamine. If the reaction occurs during the use of amorphous penicillin, it is likely that the patient will tolerate the crystalline form(15); but if the reaction occurs with a crystalline preparation, it is probably advisable to discontinue penicillin.

### *Summary*

Some of the fundamental research concerning the effect of penicillin in the treatment of syphilis, and several significant clinical reports have been summarized. Basic factors in evaluating the patient's treatment needs have been discussed.

Penicillin in oil and beeswax (POB) is the most promising therapeutic agent for the office treatment of syphilis; the synergistic effect of penicillin combined with mapharsen and bismuth may make it possible to achieve a higher percentage of "cures," with fewer reactions, than previously was possible.

A schedule for the office treatment of patients with early syphilis is suggested. The importance of following each patient by means of frequent determinations of the serologic titer for at least one year is emphasized. One should keep in mind Stokes's observation that "from A.D. 1943, it will take a year to guess, two years to intimate, five years to indicate, and a decade or more to know what penicillin does in syphilis."(16)

403 North Tryon St.

15. Barefoot, S. W., and Olansky, S.: Report of a Patient Tolerating Crystalline Penicillin without Reaction after Repeated Reactions to Crude Penicillin, North Carolina M. J. 8:82-83 (Feb.) 1947.
16. Stokes, J. H., Beerman, H., and Ingraham, N. R.: Modern Clinical Syphilology, Philadelphia, W. B. Saunders Co., ed. 3, 1945, p. 1256.

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**Complete victory over tuberculosis is in sight.** This is supported by statistics and by the opinion of those who have led the drive for eradication. The death rate continues to decrease. More adequate case finding programs have resulted in a rising percentage of minimal cases and a falling percentage of far-advanced cases.—Ed., Hospitals, Aug., 1946.

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# HEALTH EDUCATION EXPERIENCE IN THE RUTHERFORD-POLK AREA

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## *Purposes and Methods of Health Education*

The purpose of health education, according to Dr. Smillie(1), is "to inform the mass of the people concerning the principles of preventive medicine and public health." In rural health work the educational duties of the health department often encompass much more than this, for in many cases an individual must be made to forsake the habits of a lifetime and acquire new habits before he can secure the benefits of health for himself and his family—and, in some instances, before he will cease to be a menace to the health of his home and his community. The fundamental problem is to carry hygienic knowledge to the individual in his home and in his place of work. This education of the individual must consist not merely in the preaching of abstract ideas, but must result in having him apply definite and specific principles of healthful living.

The most effective method of health education is the concrete demonstration. Definite problems of health work should be undertaken as a means of educating the people in sanitation, personal hygiene, and disease prevention. Experience has shown that such demonstrations are more impressive and lead to more significant results when definite problems of public health are attacked and overcome. Furthermore, the educational work is of most value when there is an almost immediate opportunity of having the precepts put into practice. In public health work, as elsewhere, one definite and concrete example carries more weight and is more convincing than a large number of partly performed undertakings.

The object of health education, then, is to change habits and customs which interfere with the highest physical and mental development of the people. In order to accomplish this object, the people must not only become interested in health matters and be informed

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Read before the Section on Public Health and Education, Medical Society of the State of North Carolina, Pinehurst, May 3, 1946.

1. Smillie, W. G.: Preventive Medicine and Public Health, New York, The Macmillan Company, 1946.

of the discoveries of modern medicine, but must be taught how the application of our knowledge of hygiene will bring economic as well as physical benefits. The two factors to be considered in such an undertaking are the education of children, our future citizens, and the education of adults, our present citizens.

The school is the place above all others where children should be taught the principles of hygiene and sanitation—principles which are becoming more important from year to year as modern ways of living extend to an ever-increasing proportion of the population. No child should pass through school without learning the essentials of disease prevention.

The ancient adage that an old dog can't be taught new tricks is incorrect when applied to health matters. Adults, the children of yesterday, who went through the schools without being taught those principles of health conservation which should influence them as citizens, are receptive to health measures, just as they are receptive to other innovations of modern life. However, since they are accustomed to old methods of living, which were probably adequate in the past, the advantages of this new regimen must be demonstrated to them before the new practices will be adopted and followed.

### *Cooperation with Other Groups*

With these general principles in mind, it can be stated further that a health department will succeed and expand only to the extent to which it can secure the cooperation of the more intelligent citizens. The health department, with its small staff, can by itself make but slow progress in carrying its program to a county or district. More rapid progress will be made if leading citizens can be impressed with the fact that public health is as much their concern and responsibility as it is the concern of the health department. They should be made to look upon the health department staff as a group of consultants whose duty is to aid them in improving the health conditions of their communities. An effort should be made to interest especially groups of citizens whose vocation or avocation makes them of particular aid in carrying the health program to the general public. The medical profession is such a group, probably the most important; teachers and school authorities are another; and local organizations such as parent-teacher associations and women's clubs are among the other groups that can be of aid.

During the past four years, these policies have been followed by the Rutherford-Polk District Health Department, with satisfactory results. As to cooperation, the following instances may be mentioned:

(1) The health department has enjoyed the support and assistance of the medical profession. Definite programs of work, such as an anemia survey of school children, were discussed at a meeting of the county society; later, reports of findings were made and assistance obtained in the treatment of this widespread condition. In the infantile paralysis epidemic, the society was consulted regarding methods of controlling the spread of this disease. Again, two diphtheria carriers were located, treated, and cured through the cooperation of their family physicians. When defects are found in school children, the parents are advised to consult the family doctor, and much effective treatment has been obtained. At the present time, about half of the doctors placard and quarantine their cases of infectious diseases, and later report them to the health nurse. Such assistance is of great value in influencing the people to cooperate in the control of infections and in vaccination for their prevention.

(2) In the school health program, only a few of the cooperative undertakings can be mentioned. The method, in general, is for the teachers to make a preliminary inspection of the pupils, selecting children whom they believe should have a medical examination; these children are seen later by the health officer and nurses. The teachers also take a leading part in securing the vaccination of preschool children and newcomers, and in arranging for the correction of physical defects which handicap the children. The operation of the lunch rooms is another school activity in which the health department gives assistance, especially since they provide an excellent demonstration in nutrition. Regular inspections are made, and the schools take great pride in improving their standard; already a number of these cafeterias have attained a grade A rating. In the school program, more than in any other, emphasis is placed on the fact that the health

measures undertaken are part of the regular activities of the organization involved, and that the health department gives assistance as a consultant.

(3) Local organizations, such as women's clubs, parent-teacher associations, and other social clubs, are encouraged to undertake programs of community health work. For example, a number of P.T.A.'s have made surveys of their district, with the object of having every child vaccinated against diphtheria and whooping cough; Lion's Clubs are interested in seeing that every person with defective vision is treated; a Kiwanis Club transports crippled children to orthopedic clinics; and various organizations have contributed to a fund for the medical and surgical treatment of underprivileged children.

These examples of cooperation show the possibilities for enlargement of a health department's activities through assistance to local groups in carrying out health programs in which they are interested. It is understood, of course, that the health department must act as a guide in suggesting activities, as well as a consultant in methods of carrying them out.

### *Special Methods Employed*

Finally, an important phase of health education is the employment of methods by which people are made acquainted with health programs and induced to cooperate. While newspaper articles, lectures illustrated with moving pictures, conferences with community leaders, and the other usual methods of health education are employed, mention should be made of a few special methods which have met with success:

(1) A written monthly report is read to the Board of County Commissioners; this is then published in the local newspapers, and through it the general public is acquainted with the activities of their health department.

(2) A letter regarding diphtheria and its prevention is sent to each baby whose birth has been registered, when the baby is six months of age. This letter has appealed to mothers and has been instrumental in having them bring their babies for immunization.

(3) Tonsil operations are performed at our County Hospital, at a greatly reduced rate, at weekly tonsil clinics held for school children. These clinics are organized by the health department, and any school child, regardless of his family's financial standing, is given the operation at the reduced rate. Underprivileged children have the cost of their operation paid from a special fund.

(4) Eye clinics are organized, usually four a year, and financed through cooperation with the Welfare Departments and Lion's Clubs.

(5) In carrying out vaccination campaigns for school children, the objections of parents are best overcome in many instances by showing them that it is of financial advantage to have their children protected.

### *Results*

It may not be out of place to close with a paragraph of statistics which show some of the work accomplished by the Rutherford-Polk District Health Department during 1945. The district, composed of Rutherford and Polk Counties, has an area of 573 square miles and a population of 59,482, of whom about 15 per cent are colored. There are eleven staff members; in Rutherford three public health nurses and two clerks, and in Polk one public health nurse and one clerk give full-time service. The health officer, sanitarian, health educator, and the follow-up officer for venereal disease control spend one third of their time in Polk and the remainder in Rutherford. The budget for the year amounted to $25,525. The department is one of the eleven centers in the United States which has been selected by the University of North Carolina for the training of health educators. The routine program of work carried out includes the control of communicable disease, venereal disease, and tuberculosis; maternity and infancy welfare service; school hygiene; care of crippled children; improvement of sanitation; and protection of food, water, and milk.

Among the results obtained may be mentioned the immunization of 2620 persons for smallpox, 1004 for typhoid fever, 1439 babies for diphtheria, and 531 for whooping cough. No cases of smallpox or typhoid occurred, and there were only 23 cases of diphtheria reported in the two counties. In the fifty-four schools of the district (thirty-two white and twenty-two colored), 3859 pupils were examined by the health officer and nurses, while 1146 had defects corrected in health department clinics; 586 had dental treatment, 169 had glasses fitted, and 502 had tonsil operations.

### *Summary*

The most effective method of health education is by demonstration; one definite and concrete example carries more weight and is more convincing than a large number of partly performed undertakings. Both children and adults must be reached and taught to apply the principles of hygiene and sanitation in their daily living. Cooperation of leading citizens is essential, and far greater results will be accomplished if these leaders can be induced to take the initiative in carrying out local health programs, while the staff of the health department assist in the capacity of consultants.

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# BROMIDE INTOXICATION

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Winston-Salem

Although the literature on bromide poisoning is voluminous, the subject is barely mentioned in some of the recent editions of standard medical textbooks, and is omitted entirely from others. This common medical entity is often overlooked because insufficient consideration is given to it during the didactic period of medical training.

### *Case Reports*

The frequency with which bromide intoxication is overlooked may be emphasized by two brief case summaries taken from charts in the Winston-Salem City Memorial Hospital.

#### *Case 1*

A 54-year-old white female was referred to me on July 7, 1946, with the diagnosis of cerebral metastasis from a malignancy of the right breast several years before. She was admitted to the City Memorial Hospital in a state of coma and presented the picture of acidosis, uremia, or a massive cerebral vascular accident. Physical examination was essentially negative, however. The white and red blood cell counts, hemoglobin, blood sugar, and nonprotein nitrogen were within normal limits.

The patient's family stated that she had had a radical mastectomy for cancer of the breast twelve to fifteen years before. However, there seemed to be no possible connection between this condition and her present illness. The patient had been feeling bad for five or six months before admission, and had consulted a physician at the early part of this illness. He told her that she was suffering from nervousness and high blood pressure, and gave her a prescription. She responded reasonably well to the prescribed medication, and on her next visit to the physician she was advised to continue it as long as necessary. She continued to take this medicine for thirteen or fourteen weeks. Four days before her admission to the hospital she became highly excited, unruly, and irrational.

The day after the patient's admission the laboratory reported the blood bromide level to be 210 mg. per 100 cc. A diagnosis of bromide poisoning was made, and saline therapy was started immediately. Thirty-six hours after admission the patient began to show signs of consciousness. Four days after admission the blood bromide level was 118 mg. per 100 cc., and fifteen days after admission it was only 60 mg. per 100 cc. She was discharged the next day.

I have seen this woman at my office several times since her discharge from the hospital, and she states that her mind has cleared, her memory is better, and that she feels more like herself than she had in quite some time. The last blood bromide level taken was 40 mg. per 100 cc.

#### *Case 2*

A middle-aged man who had been treated at home for several days because of an ulcerous condition of the mouth was admitted to the hospital on February 2, 1946, complaining of headache and pain in the mouth. He was quite emaciated. A few days after admission he became irrational, refused his food, and tried to jump out of the window. His behavior was such that a policeman was called to watch him. Laboratory studies showed his blood bromide level to be 186 mg. per 100 cc. The patient was given intravenous saline and a high-calorie diet: three days later he was entirely rational and the blood bromides had dropped to 118 mg. per 100 cc.

Following an operation and deep x-ray therapy, the patient was discharged from the hospital on April 20. At no time after his blood bromide level decreased did he show any signs of confusion or excitement.

While I have abstracted some six or eight charts which tell a similar story, I feel that it is unnecessary to report them in detail. These two case reports show how serious this condition can become, and how great is the danger of such patients' being committed to an institution for mental disease.

### *Bromide Levels in the Blood and Extracellular Fluids*

Kleiner(1) states that the blood and extracellular fluids of the body contain about 1 mg. of bromide per 100 cc. Moore and Gray(2), however, think this level is abnormally high for the average individual who is not taking bromide medication, and they state that the normal concentration of bromide varies from .2 to .6 mg. per 100 cc. of blood. The critical level at which signs or symptoms of bromide intoxication appear varies widely.

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Read before the Eighth District Medical Society, Elkin, October 17, 1946.

1. Kleiner, I. S.: Human Biochemistry, St. Louis, C. V. Mosby, 1945.

Some persons with extremely high blood bromide concentrations show no signs of toxicity from the drug, and other patients demonstrate signs of extreme bromide intoxication when the concentration of the drug in the blood is quite low. Moore and Gray(2), however, feel that this variance is due partly to laboratory error and not entirely to variations in the sensitivity of patients to the drug.

Levinson and MacFate(3) are of the opinion that signs or symptoms of bromide intoxication never develop with blood levels below 50 mg. per 100 cc., and that when the level in the blood reaches 50 mg., bromide will be detected in the urine; therefore the absence of bromide in the urine is strong evidence against bromism. They feel that the test devised by Wuth(4) is quite satisfactory for detecting the presence of bromide in the urine, and serves as a quick and convenient method of confirming the diagnosis. The comparison of bromide and chloride concentrations in the blood and urine is more valuable than isolated blood bromide determinations alone.

In bromide intoxication the bromide level in all the body fluids, including the cerebrospinal fluid, is almost as high as that in the blood serum. Bromide displaces chloride in the extracellular fluid, ion for ion. It is eliminated from the body almost entirely by the kidney, and some say that the kidney exerts a selective action in excreting chlorides over bromide. Goodman and Gilman(5), however, state: "The kidney makes little distinction between the two halogens but rather functions to maintain the total halogen content of the extracellular fluids at a normal value." This is the reason for the administration of large amounts of sodium chloride in the treatment of bromide intoxication.

Bromide readily permeates the placental barrier, and is found in the blood and urine of infants born of mothers who have been taking the drug prenatally. It is of interest to conjecture whether many newborn babies with an acne-like dermatitis do not have a bromide rash as a result of their mothers' antepartum nerve tonic.

### *Symptoms and Signs of Bromide Intoxication*

Like most medical conditions, bromide intoxication may be either acute or chronic, mild or severe. The acute cases may progress rapidly to a state of delirium and unconsciousness, or they may take the form of any emotional state of the mentally disturbed patient. These acute cases were described as follows by the late Dr. E. B. Craven(6).

> "An individual with one or a variety of medical or surgical (somatic) complaints, has taken bromides during a period of days or weeks. After a variable length of time the patient becomes restless, irritable and emotionally labile and complains of headache, blurring of vision, interrupted sleep and disordered, usually frightening dreams. As these symptoms endure there are observed weakness, ataxia, slurring and hesitancy of speech, irrelevant conversation, poor appetite and loss of memory, particularly for recent events. Drowsiness and lethargy are soon followed by stupor, and sleep is even more disturbed by disordered dreams. Hallucinations, both visual and auditory, become a prominent feature, and maniacal attacks of excitement are provoked by the fear reaction produced."

Patients with acute bromism are commonly seen by the psychiatrist. The chronic and mild cases of bromide intoxication are much more frequent and are of most concern to general practitioners of medicine.

The symptoms of bromide intoxication are quite variable. Dr. Frederic M. Hanes(7) found that headache, irritability, emotional instability, weakness, insomnia, and loss of appetite were the most frequent symptoms in his 400 reported cases of bromism. Accompanying these symptoms were usually complaints of constipation, indigestion, dizziness, and short periods of confusion and loss of memory. The symptoms most prominent and distressing in patients with bromide intoxication are the same as those for which many physicians prescribe bromides, alone or in combination with other hypnotics or sedatives. Unless he obtains an accurate history of the medications which the patient has been taking, the doctor may convert a mild case of bromide intoxication into one of severe bromide poisoning by prescribing additional bromides.

### *The Prevalence of Bromide Intoxication*

After a series of blood bromide determinations on 500 patients seen in the Duke Hospital medical clinic, Dr. Hanes(7) stated:

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2. Moore, M. and Gray, M. G.: Blood Bromide Determinations: Their Use and Interpretation, J. Lab. & Clin. Med. 27:650-656 (Feb.) 1942.
3. Levinson, S. A. and MacFate, R. P.: Clinical Laboratory Diagnosis, ed. 2. Philadelphia, Lea & Febiger, 1943.
4. Wuth, O.: Rational Bromide Treatment, J.A.M.A. 88:2013-7 (June 25) 1927.
5. Goodman, L. S. and Gilman, A.: The Pharmacological Basis of Therapeutics, New York, Macmillan, 1941.
6. Craven, E. B., Jr.: Clinical Picture of Bromid Poisoning, Am. J. M. Sc. 186:525-532 (Oct.) 1933.
7. Hanes, F. M. and Yates, A.: Analysis of 400 Instances of Chronic Bromide Intoxication, South. M. J. 31:667-671 (June) 1938.

"We have found the information obtained comparable in helpfulness to that furnished by the routine Wassermann test." Sixty-four or 13 per cent of these 500 patients had positive blood bromide tests, and 29 or 5.8 per cent had blood bromide levels of 50 mg. per 100 cc. or above. These findings caused Dr. Hanes to suggest that blood bromide tests should be done on all patients admitted to institutions for mental disease.

Two psychiatric hospitals in North Carolina reported that in 16 per cent of their admissions a blood bromide level of 75 mg. per 100 cc. or above was found, and that in 9.5 per cent the level was above 100 mg. per 100 cc. The State Hospital of South Carolina reported that 12.4 per cent of the patients admitted had a blood bromide level of 75 mg. per 100 cc. or more, and 7.3 per cent a level above 100 mg. Wagner and Bunbury(8) reported that in 7 per cent of 500 consecutive admissions to the Colorado Psychopathic Hospital the patients were suffering solely from bromide intoxication.

Dr. C. P. Stevick(9), acting director of Bureau of Vital Statistics of the State Board of Health, states that bromide poisoning caused one death a year in 1942, 1943, 1944, and 1945. It can be concluded, however, that these cases were those in which bromide was the sole cause of death, and do not include the cases in which bromism was an allied condition. Acute bromide poisoning as a cause of death, even in attempted suicides, is extremely rare. The action of the drug is slow, and the ingestion of amounts sufficient to cause death will irritate the gastric mucosa and produce vomiting before the drug can be completely absorbed.

Bromide compounds are widely used, with and without medical supervision. Bromide is an important constituent of a large number of nostrums—"nerve tonics" and headache powders—which are advertised and sold to the lay public without a physician's prescription. Some of these are highly advertised to women for the relief of those trying periods of life associated with the catamenia and the menopause. This use alone gives it an established place in the medicine cabinet of almost every American home.

### *Treatment*

The treatment of mild cases of bromide intoxication consists in immediate discontinuance of the drug and, unless conditions contraindicate its use, the administration of large doses of sodium chloride—4 to 8 Gm. a day.

Patients with more severe intoxication should be hospitalized. Clendening(10) points out that the administration of intravenous saline as suggested by Wile is not without danger, as the too rapid elimination of bromide causes renal irritation and damage to the glomerular epithelium. He recommends an initial dose of 100 to 150 cc. of physiologic saline intravenously; if this is well tolerated, 300 to 400 cc. may be given two or three times weekly as the condition of the patient may require. Frequent urinalyses should be made.

Yater(11) is an advocate of frequent gastric lavage, and even suggests Wangensteen suction to aspirate the hydrobromic acid formed by the gastric mucosa. This, of course, is a hospital procedure reserved for the acutely ill and stuporous patient who is unable to take sodium chloride and food by mouth.

Freireich and Landsberg(12) have used intravenous amphetamine sulfate in treating 14 cases of coma resulting from overdoses of barbital, and even though these patients had taken the drug with suicidal intentions, they had only one fatality in this series. They feel that amphetamine sulfate warrants a trial in all cases of coma resulting from drug intoxication.

The importance of proper nursing care for these acutely ill and mentally disturbed patients should be impressed upon the nursing staff of the hospital, or upon the members of the family if the patient is at home. A nutritious and easily digested diet which is both adequate and appetizing should be provided. Vitamins should be given hypodermically; their mode of administration is not so important, however, as the administration of a quantity sufficient to provide for the metabolic requirements of the body.

### *Conclusion*

Bromide intoxication, especially in its milder forms, is a common condition which is too frequently overlooked. Since the symptoms of mild bromide intoxication are sug-

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8. Wagner, C. P. and Bunbury, D. E.: Incidence of Bromide Intoxication among Psychotic Patients, J.A.M.A. 95:1725-1728 (Dec. 6) 1930.
9. Stevick, C. P.: Personal communication.
10. Clendening, L. and Hashinger, E. H.: Methods of Treatment, ed. 8, St. Louis, C. V. Mosby, 1943.
11. Yater, W. M.: Fundamentals of Internal Medicine, ed. 2, New York, D. Appleton-Century, 1944.
12. Freireich, A. W. and Landsberg, J. W.: Amphetamine (Benzedrine) Sulfate for Acute Barbiturate Poisoning, J.A.M.A. 131:661-663 (June 22) 1946.

gestive of a neurosis, the physician should be careful to obtain an accurate history of all medication the patient has been taking before prescribing a bromide compound for "nervousness." In any event such a medication should never be continued over long periods of time.

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# PERSONAL HISTORY OF PULMONARY TUBERCULOSIS IN LIFE INSURANCE MEDICAL APPRAISAL

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Life insurance work would be simplified if a personal history of pulmonary tuberculosis could be disregarded in all candidates for insurance in whom tubercle bacilli have never been demonstrated—and there might not be much disturbance of mortality rates were such a policy to be pursued.

We are familiar with patients who do not have tuberculosis and have never had it, yet have a "personal history" of tuberculosis because some physician has made a diagnosis of pulmonary tuberculosis on symptoms alone in conditions ranging from bronchiectasis to hyperthyroidism or impacted third molars. They are sent to a sanatorium, where the diagnosis is corrected, but the patients spend far too much of the remainder of their lives explaining that they have never had tuberculosis. Many of these patients become neurotics permanently. Insistence on the demonstration of tubercle bacilli for a diagnosis, or on a period of observation, would usually prevent this unfortunate occurrence. A number of years ago, in a well ordered tuberculosis hospital, I observed a man who clinically had tuberculosis of his right middle and lower lobes. At autopsy a liver abscess was found to have ruptured through the diaphragm and produced the confusing picture. Similar errors occur wherever a diagnosis of tuberculosis is made without the demonstration of tubercle bacilli.

Almost any physical ailment and some psychosomatic disturbances simulate pulmonary tuberculosis and may disturb a conscientious examiner. A differential diagnosis is often difficult or impossible to make except by a positive sputum. This is not so dangerous as it might sound, since so many of the possibly confusing diseases are also uninsurable. Examples are silicosis, malignancy, chronic heart disease, Hodgkin's disease, bronchiectasis, chronic mycotic infections, congenital circulatory abnormalities, neurasthenia, hyperthyroidism, and many others. In almost all cases, however, by a period of observation or insistence on tubercle bacilli for a diagnosis the correct diagnosis can be made by the average physician. Waiting for tubercle bacilli to be found may not appeal to underwriters, but we all know that only rarely is a diagnosis of pulmonary tuberculosis made before the bacilli are present in the sputum. From 75 to 90 per cent of patients who have definite clinical symptoms before their disease is discovered are in the moderately advanced or far advanced stage. These figures are the result of examinations by all physicians, including the best tuberculosis experts, and the record of life insurance medical examiners is probably very similar.

The original diagnosis of tuberculosis, whether pulmonary or involving some other body system, is often difficult. Pulmonary tuberculosis can possibly be diagnosed at times by x-ray films before tubercle bacilli are found in the sputum, but in general we are only being reasonably conservative in insisting that no diagnosis of tuberculosis should be made without finding tubercle bacilli. Applicants for insurance who have a history of tuberculosis are much more easily handled; we know they have had tuberculosis, the diagnosis has been made, and the important thing to consider is whether the disease is arrested. X-ray examinations, sputum examinations and careful chest examinations are accepted as essential procedures before a medical appraisal can be made.

In the Occidental Life Insurance Company we insure arrested cases of tuberculosis, many of them at standard rates. However, we always require a recent examination with x-ray and a report by a tuberculosis expert. Fluoroscopy is not accepted as adequate. We prefer that the examination be made at the institution at which the applicant was treated and the disease arrested. We consider that these cases are good risks; they have taken the cure and know how to protect themselves from reinfection or relapse. The

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incidence of recovery in early or minimal cases is so high that they would not constitute a serious hazard were recurrences or reinfections to develop. Our experience with these cases has been very favorable. We have had no claims in many years from arrested cases; our experience with family contacts has not been so favorable. For every known personal contact there are likely to be several unknown exposures. Physicians recognize this danger and usually instruct relatives as to proper precautions against infection.

Fortunately, tuberculosis does not impose the hazard seen several years ago when million dollar policies were in vogue for men who had just learned from electrocardiograms that their life expectancy was short. If recognized and treated early in the course of the disease, tuberculosis does not impose hazards comparable to myocardial infarcts, and any large policy holder is likely to secure adequate treatment and arrest of the tuberculous process if he learns of it in the early stages.

### *Tuberculin Test*

In the Occidental Life Insurance Company we do not use the tuberculin test, we have never used it and we disregard reports regarding adults based on a tuberculin test alone. One could not consider any positive tuberculin test, *per se*, an impairment. The tuberculin test has a screening value in children to suggest which need investigation by x-ray and other procedures, but is of very little value in adults.

Any system of the body may be involved by a tuberculous infection; especially is this true in childhood. Many of these heal and remain quiescent throughout a long life of good health, though ready to break down and disseminate active tubercle bacilli should circumstances favor such an accident. Many patients recover entirely with no residual signs that can be demonstrated. As a result, a great proportion of adults over 25 years of age show a permanently positive tuberculin test. A large percentage of these positive reactors do not have any demonstrable tuberculous disease and will never show any.

A positive tuberculin test is quite upsetting to anyone, no matter how healthy the individual may be. However, this experience might be justified were the test reliable.

In adults, as well as in many children, the test has been discredited widely, though it has many advocates who are experts in the field of tuberculosis. Before we accept its use and attach too much credence to results of the test, we should be cognizant of several facts(1):

1. The tuberculin test is often negative in far advanced or malignant tuberculosis.
2. During a period of three to eight weeks following the onset of a tuberculous infection, the individual is tuberculin-negative.
3. Repeated tuberculin tests may cause the reaction to become negative from desensitization.
4. There is good evidence that a tuberculous infection confers some immunity; if so, a tuberculin-positive reactor should be a better insurance risk than a negative reactor, provided there is no demonstrable activity about the body(2).
5. A positive tuberculin test demonstrates the ability of the individual to develop immunity to the infection.

From an economic standpoint, mass x-ray filming is cheaper. For tuberculin tests, the individual must be seen and tested; then return visits are required, at least once, and often more, to read the results of the test. If the test is positive, the individual must return for x-ray. If much value is placed on time, an initial film made on 70-mm. film at a cost of five cents is cheaper than the repeated visits for tuberculin testing without filming of approximately half of the adults. Also, there is too strong a personal element in tuberculin testing. It is probable that every adult would show a positive tuberculin test if tested with a large enough dose of tuberculin. So, while there are standards for testing, it appears that with adults it is a question of how much reaction to tuberculin is present.

### *Pleurisy*

A history of pleurisy is about as indefinite from an insurance standpoint as a history of tuberculosis without the demonstration of tubercle bacilli. There was a time when pleurisy was assumed to be tuberculous until proved otherwise.

Now we recognize that many thoracic pains are not pleurisy. Often a diagnosis of pleurisy is made when some very different

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1. (a) Pinner, Max: Pulmonary Tuberculosis in the Adult. Springfield, Illinois, Charles C. Thomas, 1945, p. 159.
   (b) Miller, J. A. and Wallgren, A.: Pulmonary Tuberculosis in Adults and Children, New York, Thomas Nelson and Sons, 1939, pp. 30, 116.
2. Pinner, Max(1a), p. 92.

condition is responsible for the pain. Also, many pleuritic pains, such as from spontaneous collapse of a lung, may be associated with pleurisy and effusion but present nothing to prove a tuberculous infection. Bronchiectasis causes pleurisy, cough, sputum and more tendency to hemoptysis than tuberculosis, with no tubercle bacilli in the sputum.

In contrast is the fact that true tuberculous pleurisy, usually present at the apex, is very often diagnosed as neuritis or rheumatism of the shoulder. Far too frequently a normal appendix is removed because of the referred pain of diaphragmatic tuberculous pleurisy.

An applicant for insurance who gives a history of pleurisy should have x-ray studies made. Agents should be willing to cooperate and favor this investigation since it can usually help secure a standard rate for the policy.

There is room for serious doubt that pleurisy should be considered tuberculous unless there is some definite proof. If there is reasonable ground for suspicion, a short waiting period will usually rule out tuberculosis.

### *Sputum*

The free use of sputum examinations in all applicants who give a history of a cough of any type is indicated. Any cough is usually referred to by the possessor as "a cigarette cough." There should always be a careful study of sputum for any applicant who has a cough. If there is cough, there is usually sputum if the examiner will instruct the applicant as to methods of producing sputum and collecting it(3). Too many examiners do not report "a cigarette cough," considering it inconsequential.

It is quite possible that in the matter of sputum examinations we are more lax than in any other phases of studies for medical appraisal of risks. Sputum specimens are easily collected and the examination of the specimens is not too difficult, especially in comparison with the information that can be obtained by this means. The culture of sputum for tubercle bacilli has appeared to be quite formidable in the past, but with some of the newer synthetic media excellent results are being obtained. Sputum cultures are becoming much more popular and are certainly far more dependable than smears.

### *Routine Surveys*

Probably the most effective method of improving control of tuberculosis will result from very early diagnosis—much earlier than is customary at present. Routine surveys are being made of large groups of persons by many large manufacturing plants, health departments, schools and others. These are made relatively inexpensively on 35 or 70-mm. film which can be magnified for study. Such surveys act not only as safeguards for the individual and for the population as a whole, but they pick up early cases of tuberculosis in the stage that is easily cured.

In other groups, the tuberculin test is used on the entire group and films are made of all who show positive intradermal reactions. Other investigators give fluoroscopic and stethoscopic examinations to all reactors. These tests are very valuable in skilled hands, but cannot detect pulmonary lesions at as early a stage as x-ray films. In the average hands, fluoroscopy is of no more value than stethoscopic examinations.

Mass chest x-ray surveys, which are being started widely and appear likely to be continued indefinitely, should locate practically all active clinical cases in any group in the early stages. From 75 to 90 per cent of patients who have definite clinical symptoms before their disease is discovered are in the moderately advanced or far advanced state. When large groups of apparently healthy people are x-rayed, from 65 to 85 per cent of those found to have tuberculosis have the disease in the minimal stage. Ninety per cent of all patients with minimal tuberculosis who take the cure will live out their normal span of life. A comparison of these figures will give an idea as to how wide a margin there is between recognized and unrecognized cases in any group of the population. Early diagnosis and treatment will make 90 per cent of tuberculous patients eligible for life insurance at standard rates.

In the future, life insurance companies may be able to have access to files of mass x-ray chest films and use them in medical selection. Each applicant now should be quizzed as to whether chest films have been made, and applicants should sign a routine requisition for such information. This would speed up the handling of applications for

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3. Caviness, Verne S., in Proceedings of the Twenty-Eighth Annual Meeting of the Medical Section of the American Life Convention, 1938, p. 111.

insurance and often help the applicant secure a better rate on his policy.

Appraisal of risk in applicants who give a history of pulmonary tuberculosis is much easier than it was twenty years ago. Mortality and morbidity rates from tuberculosis have dropped very substantially and can reasonably be expected to continue to drop. The hazard is now so much less that rates for applicants with healed tuberculosis have been lowered.

It is certainly now well in order to consider whether any group of applicants with arrested pulmonary tuberculosis will not show a more favorable mortality ratio than a group of applicants with blood pressure readings of 135 systolic, 88 diastolic—for which condition a standard rate is used.

### *Tuberculosis—A Diminishing Hazard*

Fortunately for life insurance companies, as well as for applicants, tuberculosis is a diminishing hazard. Undoubtedly, this fact is largely a result of education and intensive treatment. In 1900 the death rate in the United States from tuberculosis was listed as 202 per 100,000 population. This figure is probably fairly accurate. In North Carolina in 1915, which was the first year that reasonably accurate statistics were available, the death rate was 156.4 per 100,000. The same year, 1915, the national death rate from tuberculosis was 140.1. For the year 1944, the national rate was 40.8 per 100,000 and for North Carolina it was 30.2 per 100,000. In spite of the 29 per cent Negro population in North Carolina, the national death rate from tuberculosis in 1944 was one third higher than in North Carolina. Of the 1132 deaths from tuberculosis in North Carolina in 1944, 684 occurred among the 29 per cent Negro population, and only 448 among the 71 per cent white population(4).

North Carolina has pioneered in tuberculosis control. In 1906 the first state-owned and operated tuberculosis sanatorium was built at Sanatorium, North Carolina, and has been in continuous operation, with two large additional units later built in the western and eastern sections of the state. Twenty counties—ten rather extensively—also operate county institutions for the diagnosis and treatment of the disease. Tuberculosis among cattle has been eradicated as a state procedure. There are as many beds in tuberculosis institutions for the 29 per cent Negro population as for the 71 per cent white population. Negroes have full opportunity for diagnosis and treatment, but in general are not susceptible to too much education, so the discrepancy in death rates between the races is largely due to lack of cooperation and to an apparently greater susceptibility among Negroes.

This record appears to suggest that tuberculosis can be controlled and probably eliminated as an insurance hazard. In the white population of North Carolina it is certainly not now a serious life insurance hazard—approximately 20.2 deaths per 100,000 population as compared with the national rate of 40.8 per 100,000.

Rapid strides have been made in the treatment of pulmonary tuberculosis(5). In 1922, as a resident, I watched the healing of cavities by the slow natural course and the more rapid healing with artificial pneumothorax. Since that time my friends have shown me many patients whose cavities have healed.

Many new methods of treatment have been tried and found to be effective. A recent innovation is the simple use of lucite balls(6) to obviate the necessity of the radical operation of thoracoplasty — usually performed in patients scarcely able to cope with such a procedure.

### *Streptomycin*

Much wishful thinking and over-optimism have obscured the facts regarding the value of streptomycin in the control of tuberculosis. The full details of the effect of streptomycin on tuberculosis have not been determined. It has been recognized for some time that from its use there is a profound inhibitory effect in guinea pigs, but tubercle bacilli can be demonstrated in 75 per cent of the pigs. In human beings, it has an inhibitory effect on the growth of bacilli, and lesions may regress or even heal. The disease becomes more protracted, with some fibrosis and evidence of healing. All miliary cases can be expected to die, and other cases are protracted without recovery. In tuberculous meningitis there may be evidence of healing of the process, but the patient is likely to be made mentally defective and blind. In addi-

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4. Yerushalmy, J. and Moriyama, I. M.: Tuberculosis Mortality in the United States and in Each State. U. S. Pub. Health Rep. 61:487-516 (April 5) 1946.
5. Pinner, Max(1a), pp. 73, 76.
6. McCain, Irene, and McCain, Paul P.: Revival of Extrapleural Pneumonolysis with the Use of a New Filling Material, Methyl Methacrylate, North Carolina M. J. 8: 6-12 (Jan.) 1947.

tion, streptomycin causes a disturbingly high incidence of disconcerting reactions, such as fever, skin eruptions, vertigo, tinnitus, and deafness, which are very likely to appear at about the eighth to the tenth days of treatment. Severe renal involvement with albuminuria and casts, may appear after two to three weeks of treatment(7). It is reasonable to conclude that streptomycin will never have a very extensive use in medicine and that it will not be likely to find favor for use in tuberculosis.

### *Conclusions*

1. The medical director is faced with an important task in appraising insurance applicants who have a personal history of tuberculosis. He needs examinations by experts in the field of tuberculosis.

2. It is apparent that an applicant with a personal history of pulmonary tuberculosis requires individual attention and study. Every case is different and should be considered individually after a thorough investigation of the extent of the original involvement, the thoroughness of healing, the degree of cooperation of the patient, and many other factors that vary widely but materially influence the risk. By such a study, many applicants can safely be given policies at standard rates if their lesions are completely healed.

3. A diagnosis of tuberculosis without the finding of tubercle bacilli results in many false-positive diagnoses, and is rarely if ever justified or necessary.

4. The tuberculin test serves a very useful place in the evaluation of tuberculosis in children. In adults, it is too misleading to warrant its use for life insurance purposes.

5. Tuberculosis is a rapidly diminishing hazard.

6. A history of contacts is much more hazardous than a history of healed tuberculosis. Every examiner should question the applicant carefully and report in detail regarding all personal contacts with tuberculosis, making his report especially detailed if an intimate association has existed.

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The author wishes to thank Drs. P. P. McCain, S. M. Bittinger and T. F. Vestal for valuable assistance in the preparation of this paper.

7. Keefer, Chester: Streptomycin, discussion at American College of Physicians meeting, Philadelphia, May 13, 1946.

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# SOME ALLERGIC MANIFESTATIONS OF THE EYE

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WINSTON-SALEM

The fact that allergy is assuming more and more importance in the general medical field has prompted me to bring to the attention of this section this elusive and intangible subject as applied to the human eye. All of us have numerous patients with puzzling irritative eye conditions which are never diagnosed or fully understood. All possible questioning of the patient and investigation of his contacts, exposures, and habits of life give us only a small fraction of the total picture. Often we accidentally stumble on the true nature of the case. Perhaps a patient comes for a change of lenses, stating that he has no discomfort all day in his office, but that when he attempts to read the daily paper in the evening his eyes itch and burn so that he has to abstain from the effort. Such a patient may be sensitive to the fresh printer's ink on his newspaper. The remedy in such a case would be for the patient to keep his fingers away from his eyes after handling his paper. A woman may suddenly develop an edematous condition of the conjunctiva while on a shopping expedition. The remedy in this case would likewise be simple, if we could only know that she is sensitive to mold and that on leaving home she had put on a pair of leather gloves which had been stored away for months.

### *Ocular Diseases Produced by Allergy*

Almost any tissue of the eye may be affected by allergic disorders, and the list of ocular conditions in which allergy has to be considered as a possible etiologic factor is almost as long as that of the offending agents themselves. The pathologic ocular manifestations of allergy include angioneurotic edema, dry and ulcerative marginal blepharitis, chalazia, follicular conjunctivitis, vernal conjunctivitis, phlyctenular conjunctivitis, and keratitis and tuberculous ulcerative keratitis(1). There may be ulcers or interstitial opacity of the cornea(2), iritis, iridocyclitis,

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Read before the Section on Ophthalmology and Otolaryngology of the Medical Society of the State of North Carolina, Pinehurst, May 3, 1946, with a film in colors on "Vernal Conjunctivitis," lent by Dr. Louis Lehrfeld of Philadelphia.

1. Urbach, E.: Diagnosis and Treatment of Food Allergens through Propetans, Ann. Allergy 1:219-34 (Nov.-Dec.) 1943.
2. Lemoine, A. N.: Allergies in Ophthalmology, Arch. Ophth. 28:79-92 (July) 1942.

uveitis, endophthalmitis, retinal hemorrhage or detachment, lesions of the choroid, optic neuritis, retrobulbar neuritis(3), sympathetic ophthalmia, cataract, or scintillating scotoma. In rare instances the extraocular muscles may be affected.

In cases of ocular allergy due to syphilis, antisyphilitic chemotherapy and fever therapy are indicated(2). In cases due to tuberculosis, the patient should receive the usual treatment for this disease, plus weekly intradermal injections of tuberculin. Some cases of allergic ocular disease due to tuberculosis responded to desensitization by the inhalation of boiling suspensions of dead tubercle bacilli.

Uveitis, retinal hemorrhage, and detachment of the retina may follow insulin therapy. Keratitis phaco-anaphylactia is due to sensitization to lens protein. Cataract may develop as a result of hypersensitivity to dinitrophenol(4). Allergic cataract in young adults is always bilateral and occurs in previously normal eyes. Cataract was described in 10 patients showing a constitutional allergic predisposition(4). In patients sensitive to lens protein it is important that desensitization be accomplished before removal of the cataract. Patients suffering from sensitivity to uveal pigment should also be desensitized before undertaking ocular surgery, as sympathetic ophthalmia has been attributed to such hypersensitivity.

Some cases of severe ophthalmitis involving the cornea and iris and associated with increased pressure and severe visual disturbance have been interpreted as allergic, because of the associated Quincke's edema. The eye and its adnexa are frequently sympathetically involved in allergic diseases of other organs. The parenchymatous keratitis of congenital syphilis has been interpreted as being of allergic origin. Allergic conditions often follow operations on the eye which liberate various metabolic products.

### *Allergens Responsible for Ocular Manifestations*

Among the offending agents may be substances of mineral, vegetable or animal origin. The patients may be found sensitive to emanations from horses, dogs or cats, to ointments containing wool fat, to proteins or metabolic products within their own bodies(5), or to bacteria, fungi, pollens, fumes or dust.

Cases of ocular disorders due to poison ivy and poison oak have been reported. Insect bites, clothing, and bedding materials have been incriminated. Numerous cosmetics, including rouge, hair rinses and dyes, and mascara(2), not to mention various lotions and soaps(3), may give rise to allergic symptoms. Hypersensitivity to foods such as cantaloupe(6), milk(7), eggs, wheat, beans, cherries, strawberries, coffee, and so forth, may be manifested by ocular symptoms. Among the many drugs known to have been responsible for diseases of the eye are aspirin(6), atropine(8), mercury, silver nitrate(3), barbiturates, camphor, quinine, coal-tar products, carbon tetrachloride, dinitrophenol, sulfathiazole(9), local anesthetics(10), eserine, pilocarpine, zinc sulfate, vaseline, and sesame oil. Simple mechanical irritation such as plucking the eyebrows may give rise to allergic manifestations in some patients, while in others light, heat, cold, x-rays or ultraviolet rays may be allergenic.

### *Diagnosis of the Etiologic Agent*

With such a formidable array of possible etiologic agents, diagnosis is not always an easy matter. In some cases, to be sure, mere questioning of the patient regarding his own history and the family history may reveal allergic traits or the history of repeated attacks either seasonally or in connection with certain habits or occupations of the patient. Often a better history can be obtained by requesting the patient to fill out a questionnaire regarding the varied and multiple conditions and associations which may be of etiologic significance, including the family history, history of operations, accidents, aversions, intolerance to prescribed medicines, diseases such as asthma, hay fever and

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3. Glover, L. P.: Ocular Allergy, Pennsylvania M. J. 43: 1083-4 (May) 1940.
4. Beetham, W. P.: Atopic Cataracts, Arch. Ophth. 24:21-37 (July) 1940.
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6. Thomas, J. W. and Warren, W. A.: An Analysis of 30 Consecutive Cases of Allergic Conjunctivitis, Cleveland Clin. Quart. 7:3-9 (Jan.) 1940.
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8. Bab, W.: Allergy of the Eye, Am. J. Ophth. 24:759-767 (July) 1941.
9. Morrison, W. H.: Allergic Conjunctivitis and Dermatitis from the Topical Use of Sodium Sulfathiazole and Sulfathiazole, Am. J. Ophth. 25:1104-5 (Sept.) 1942.
10. McAlpine, P. T. and Berens, C.: Allergic Dermatitis and Blepharoconjunctivitis Caused by Pontocaine, Am. J. Ophth. 25:206-208 (Feb.) 1942.

migraine, and the psychic status of the patient.

In some cases little pertinent information may be gleaned from the history. The physician may have to visit the home and working quarters of the patient in an effort to discover the offending agent. In obscure cases it is best to have the patient submit to a complete general examination, including blood chemistry determinations, Wassermann test, tuberculin test, and determination of the basal metabolism. A special examination by an allergist may then be necessary. The possibility of combined etiologic factors must be considered; in such cases one factor may be endogenous and the other extrinsic. In one case of combined bacterial and food sensitivity the conjunctivitis cleared up following 30,000 units of staphyloccus antitoxin, but the corneal lesions did not subside until beans and wheat were eliminated from the diet.

In a number of cases skin tests may yield the desired information. For this purpose one may employ the patch test, scratch test, or intradermal test. Jadassohn-Bloch has devised a patch test yielding a maximum reaction after twenty-four hours. The intracutaneous test is said to be the most reliable, however. A. C. Woods(11) and Lehrfeld recommended intracutaneous tests yielding results within fifteen minutes.

Occasionally cutaneous sensitivity does not parallel the sensitivity of the conjunctiva, so that an additional eye test becomes necessary. For the latter a 1:10, 1:100, or 1:1000 dilution of the antigen is instilled into the conjunctival sac. The reaction is considered positive when there occurs an immediate reddening and swelling. In such cases the conjunctival sac should be rinsed at once with adrenalin, in order to avoid a severe reaction.

If these tests fail to make the diagnosis clear, one may have to resort to elimination or avoidance tests, and try to discover the offending agent by removing the patient from various contacts and eliminating different foods in turn. Taking out a rug, changing the patient's mattress, pillows or clothes, or removing animals or plants from the house may finally give the answer. In some obscure cases removal of foci of infection may clear up the allergic disorder.

## *Vernal Conjunctivitis*

One of the most common allergic ocular manifestations is vernal conjunctivitis. This may be a transitory condition disappearing spontaneously at the end of the pollinating season. There are two types of this disease —the limbic and the lid type(5). The limbic type is characterized by phlyctenular-like vesiculation at the limbus. The blebs may be either discrete or confluent, so that an arc may involve the whole circumference of the limbus. The lid type is a more severe and persistent condition and may recur throughout the winter after the pollinating season is over. It is associated with a heavy, viscid, "chewing gum" type of mucus. The conjunctival surface of the lids, especially the upper, exhibits a simple follicular conjunctivitis. After several years, these follicles may present a cobblestone appearance, or may even become giant graulomas. The limbic and lid types are never seen together in the same eye. The Negro never has the lid type.

### *Pathologic picture*

Pathologic specimens of the lid type of vernal conjunctivitis reveal new mucous glands, from which comes the characteristic "chewing gum" mucus seen in no other eye disease. Eosinophils are seen in the tissues and blood vessels. The "chewing gum" mucus is composed of mucus, epithelial cells, lymphocytes, and often eosinophils. The lesions in the limbic type consist of a few phlyctenules and blebs at the limbus, with blood vessels pointing up to them but not reaching the cornea. A mild conjunctivitis, with mucous discharge, is present. Lehrfeld says that the pathology of the lid type of vernal conjunctivitis is comparable to that of urticaria of the skin, while the pathology of the limbic type compares with that of eczema.

### *Symptoms*

In both types of vernal conjunctivitis the main symptoms are itching, lacrimation, redness and edema of the lids, and eventual scaling and even ulceration. The conjunctiva shows a boggy infiltration and a discharge that is at first slightly purulent. Secondary infection may confuse the picture.

Itching is one of the chief symptoms requiring treatment. It may be very severe, and serves occasionally as an aid in differentiating vernal conjunctivitis from catar-

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11. Woods, A. C.: Allergy and Immunity in Ophthalmology. Baltimore, Johns Hopkins Press, 1933, p. 98.

rhal conjunctivitis, pink-eye, and trachoma. In acute catarrhal conjunctivitis itching occurs only after the discharge has subsided. In pink-eye, the itching is of shorter duration and responds promptly to treatment, while in trachoma itching is absent. In pink-eye, a smear from the conjunctival disc will show the Koch-Weeks bacillus. In trachoma there is no eosinophilia, no seasonal incidence, and no viscid mucus; the blood vessels seem to extend to the cornea, and visual acuity, which is not often affected in vernal conjunctivitis, is impaired. In trachoma of long standing there is evidence of secondary pannus.

*Treatment*

Various measures have been suggested to relieve the symptoms of vernal conjunctivitis until the offending allergen can be discovered and desensitization accomplished, or for use in patients who refuse the exacting process necessary for diagnosis and proper specific therapy. General treatment includes rest, fresh air, and hygienic measures. Foci of infection should be removed, and any associated disease should receive adequate treatment. In cases of sensitivity to food good results have often been obtained by the oral administration of histaminase in doses of 20 units three times a day. Calcium may also be administered in small oral doses over a long period. In some cases the administration of vitamin D or riboflavin has been found of benefit. Frequently a salt-free diet may give relief, and patients are advised to avoid conserved foods.

Frequent irrigations with saline, boric acid solution, or boroglyceride are helpful. Pure paraffin oil may be applied, and then washed out with lukewarm saline. For local eczema of the lids, Lemoine(2) recommends a 2 per cent silver nitrate solution. Astringents and antiseptics should be avoided. Lotions of a low *p*H and cold compresses often give relief. Occasionally in very severe cases 0.25 per cent neosynephrine hydrochloride solution or 1:2000 epinephrine hydrochloride may be tried.

The late Dr. Emory Hill(12) advocated the use of 1 per cent acetic acid, followed by ice packs, three times a day to allay itching. Lehrfeld(5) uses a 1 per cent phenacaine solution, 3 drops three times daily, or more often, especially at night when the itching is worse. This should be followed immediately by 3 drops of epinephrine in a 1:1000 solution. Cold compresses or application of a handkerchief saturated from an ice cube will prove of value in relieving symptoms. Smoked glasses may be worn to protect the eye from dust, wind and pollens, as well as from light. The eye should be irrigated seven times during the day—before and after each meal, and before retiring. After each irrigation three drops of a 1 per cent solution of monohydrated sodium carbonate in 5 per cent alcohol is instilled into each eye, to remove the tenacious mucus. It is emphasized that the applications of phenacaine and adrenalin must be made after and not before the irrigations.

## *Summary*

Some allergic manifestations of the eye are enumerated, and a few of the allergens which may be responsible for these conditions are listed.

Methods which may be used to diagnose the etiologic agent in cases of ocular allergy are discussed.

Vernal conjunctivitis and its treatment are considered.

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# Maternal Welfare Section*

## INDICATIONS FOR THERAPEUTIC ABORTIONS

There is no therapeutic procedure in the practice of medicine for which indications are as poorly outlined as for the obstetric operation of therapeutic abortion. The moral and ethical considerations are often the principal guides which are followed by our profession in arriving at a decision to perform this serious procedure. For this reason, it is not remarkable that the indications vary widely from one locality to the other, and that the socio-economic and socio-medical factors play a prominent part in the decisions which are made. In the medical curriculum of a decade ago, a definite place was provided for teaching medical ethics and the sound ethical principles which have been

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12. Hill, Emory: Personal communication.

*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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| J. Street Brewer, M.D. | Ivan Procter, M.D. |
| G. M. Cooper, M.D. | R. A. Ross, M.D. |
| E. W. Franklin, M.D. | R. A. White, M.D. |
| J. S. Hunt, M.D. | Frank R. Lock, M.D.,<br>Chairman |
| T. L. Lee, M.D. | |

largely responsible for the highly respected position of the medical fraternity in America. During recent years the restricted curriculum and the expanding need for teaching the rapidly developing specialties have curtailed the amount of time given to these fundamental principles of medical ethics.

The incidence of therapeutic abortion in representative clinics in the United States during recent years shows the divergent philosophy observed in regard to this serious problem. The incidence of this procedure has been shown by Cosgrove(1) to range from 2.88 per cent of obstetric admissions for Johns Hopkins Hospital during 1941 and 1942 to a low of 0.006 per cent for the Margaret Hague Maternity Hospital between 1931 and 1943. The ratio in the first instance is 1 therapeutic abortion to 35 deliveries, in the latter, 1 to 16,750 deliveries.

Cosgrove has also shown that the meaning of therapeutic abortion is poorly defined, and that the law in most of the jurisdictions of this country is based upon the old English common law, which contains little of a specific character.

It may be said that the medical profession, from the nature and obligations of its work, is and will continue to be a highly ethical group. Nowhere does this ethical sense have a more direct bearing than in relation to abortions. The present concept of the place of therapeutic abortion makes it a procedure which is indicated only when the evidence shows that the pregnancy imminently threatens the life of the mother. A maximum rather than a minimum number of persons should participate in the decision to perform such an abortion.

This procedure is a highly dangerous one under the most desirable circumstances. Since last August three women in North Carolina have lost their lives as a result of the procedure, which was offered to them and to their families as a life-saving measure. There is no question but that therapeutic abortion has a place in the field of obstetrics. However, few absolute indications for the operation exist. Practically all of the complications for which the procedure is usually suggested can be managed successfully when sufficiently skilled professional help is available, when there are facilities offering the patient the advantage of every modern obstetric technique, and when the patient is able to follow the advice of the physician. In such cases the indication for abortion is a relative one, and the decision to suggest this solution is influenced by the patient's social and economic status, which influences her ability to follow rigid rules of conduct and care; by her intelligence and that of her family, which influence her willingness to accept and follow the advice; and by the availability of specially trained medical personnel and modern facilities.

### *Absolute Indications*

The only generally accepted *absolute* contraindication to pregnancy and *absolute* indication for therapeutic abortion when pregnancy occurs is hypertension resulting from renal disease. The toxemias (hypertension in pregnancy) have recently been reviewed in this section of the JOURNAL(2). The present concept is that pregnancy should be interrupted when renal disease with clear evidence of renal deficiency is present during the early weeks of gestation. Pregnancy in the presence of other hypertensive lesions has a variable prognosis, and a careful etiologic diagnosis must be made in order to reach a proper decision as to whether or not pregnancy must be terminated.

### *Relative Indications*

Relative indications for the interruption of pregnancy include numerous medical problems and require careful evaluation of the many factors which must be considered in each individual case. Errors occur much more frequently as a result of radicalism than through failure to interrupt pregnancy.

1. *Heart disease.* Experience of the principal clinics suggests that there is justification for abortion only in the gravest cases. When sufficiently careful management is given, the prognosis of pregnancy and labor in such cases is slightly better than the prognosis of an operative interruption of pregnancy. Highly specialized supervision of the patient's course is essential to good results, however, and her ability to receive and accept this care must always be considered.

2. *Hyperemesis gravidarum* was a common indication for therapeutic abortion in years past. With the advent of treatment by intravenous glucose, parenteral vitamins,

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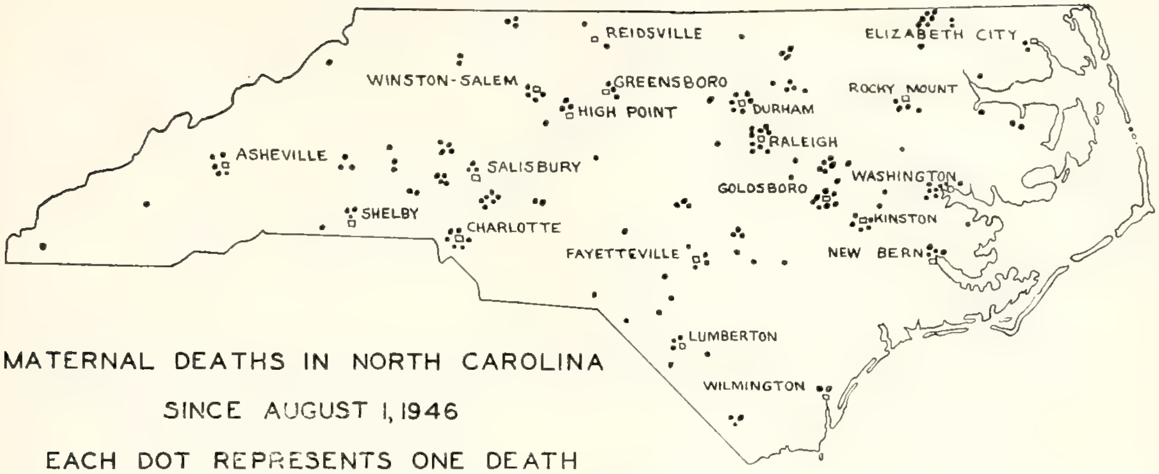
1. Cosgrove, S. A., and Carter, P. A.: A Consideration of Therapeutic Abortion, Am. J. Obst. & Gynec. 48:299-314 (Sept.) 1944.

2. The Management of the Toxemias of Pregnancy, Maternal Welfare Section, North Carolina M. J. 8:31-34 (Jan.) 1947.



MATERNAL DEATHS IN NORTH CAROLINA

SINCE AUGUST 1, 1946

EACH DOT REPRESENTS ONE DEATH

and other special procedures, it has been removed from the group of acceptable indications. Kuder and Finn(3) call attention to the fact that in the New York Hospital no pregnancy has been interrupted for vomiting since 1938. In Cosgrove's series of 290 patients treated for this condition there were no deaths; one therapeutic abortion was performed in 1939, and in retrospect he questioned the necessity of this.

3. *Pulmonary tuberculosis and tuberculous lesions in other areas* present a highly specialized problem. Decided differences of opinion exist. Many qualified observers feel that pregnancy has little effect upon pulmonary tuberculosis which is under adequate treatment, and that the lesion is not seriously accelerated in the course of pregnancy if it is given sufficient treatment. On the other hand, tuberculosis under any circumstance is an extremely serious condition, which may progress rapidly unless sufficient treatment is given. The decision as to the management of pregnancy in the presence of this disease must be left to the phthisiologist.

4. *Urologic lesions of infectious types* (pyeloureteritis) seldom, if ever, indicate an interruption of pregnancy since the advent of chemotherapy and the treatment of these lesions with antibiotics. Other urologic lesions, including stones, polycystic kidneys, and kidney tumors, are problems which require individual consideration in each case.

5. *Neurologic and psychiatric disease* has become an important problem as related to pregnancy. Genuine psychiatric consultation should be obtained before a decision is reached, and therapeutic abortion is never indicated unless the condition is grave enough to contraindicate any future pregnancy. Epilepsy is also a highly specialized problem, and specific techniques of diagnosis, including electroencephalograms and examination of the husband, are necessary before a decision is made to interrupt pregnancy in the presence of this condition.

6. *General medical and surgical problems* at times provide an indication for therapeutic abortion. Kuder reports the use of therapeutic abortions in 2 patients with Hodgkin's disease, one patient in whom ulcerative colitis had resulted in invalidism, and 4 with previous carcinoma.

In general, an attitude of ultra-conservatism should prevail, and therapeutic abortion should be recommended and performed only when the diagnosis has been proved and when the lesion is one with an extremely poor prognosis which is adversely affected by pregnancy. *Therapeutic abortion is never justified for the chronically ill, loudly complaining patient who presents no specific disease.*

### *Conclusions*

Greenhill says: "We consider the operation of the induced abortion one of the most dangerous in obstetrics."(4) Cosgrove says: "In one first-class American clinic 5.5% of the therapeutic abortions died as a direct result of that procedure."(1)

In North Carolina three women have lost their lives from complications of therapeutic abortions since August 1, 1946, and in each

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3. Kuder, K., and Finn, W. F.: Therapeutic Interruption of Pregnancy, Am. J. Obst. & Gynec. 49:762-773 (June) 1945.

4. Greenhill, J. B., quoted by Cosgrove and Carter(1).

instance the primary disease was one which the patient could easily have survived with careful management. The widespread and more or less indiscriminate performance of abortion is recognized by all students of the subject as a major factor in puerperal mortality and morbidity.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## VI

## DR. HOLMES ANSWERS THE QUESTION*

On Monday evening, February 13, 1843, the Boston Society for Medical Improvement gathered for a regular meeting in the society's rooms on Tremont Row. The paper for the evening was to be presented by Dr. Oliver Wendell Holmes, an active member of the society since 1836. From Dr. Holmes, the group had learned to expect variety—an anatomic anomaly, a bit of abstruse medical history, a warm defense of Louis's numerical system, a discourse on giants, or—for special occasions—amusing verses, such as his "ingenious . . . description of the two scourges of the human race, malaria and syphilis."(1) As *The Boston Medical and Surgical Journal* observed, Dr. Holmes was "alike celebrated for ready wit, a good song, and a candid investigation."(2) It was a candid investigation which he offered his colleagues on February 13—his essay, "The Contagiousness of Puerperal Fever."

Written "in a great heat and with passionate indignation,"(3) the essay answered a question proposed at a meeting of the society three weeks earlier. On January 23, the group had held an "animated discussion," evoked by Dr. John Barnard Swett Jackson. Dr. Jackson had asked the society's opinion "as to the contagion of Puerperal Fever and the possibility of physicians communicating it from patient to patient."(4) Within twenty-four hours, Dr. Holmes was raiding the Athenaeum Library for the literature of the disease(5) and badgering his fellow-practitioners for accounts of their experiences.

The immediate stimulus for his undertaking the investigation was Dr. Jackson's question, but the question itself was the culmination of a series of discussions of puerperal fever. In the minds of Holmes and his colleagues as they argued the point at the meeting of January 23 was the recollection of Dr. Jackson's report on the death of Dr. Barker of Lynn, a report given at a meeting on January 9. Dr. Barker had died as the result of a dissection wound incurred during an autopsy on a puerperal patient. At that same meeting, the obstetrician Walter Channing had presented—for the third time in six months—a report on a series of puerperal cases occurring in his practice(6). The debaters would recall, too, the cases described by Dr. John Fisher on October 11, 1842—cases of dissection wounds, like that of Dr. Barker, incurred during an autopsy on a puerperal patient and resulting in severe illness for a doctor and death for a medical student(7).

Dr. Holmes had presided at the October meeting; he had heard Channing's three reports; the meeting of January 9 had impressed him so much that he made a special note of it in his medical case book(8). He knew, too, that in Philadelphia Dr. Francis Condie had reported to the College of Physicians a series of puerperal fever cases and suggested the possibility of contagion(9)—a notion dismissed as nonsense by Dr. Charles D. Meigs, the leading Philadelphia obstetrician and author of the standard American text on obstetrics(10). Dr. Jackson's query was all Holmes needed to set him going on his twenty-one day quest.

As the horrifying facts emerged from the literature of the disease, Holmes came to the unshakable conviction not only that puerperal fever is highly contagious but also that doctors and nurses are culpable agents of infection. The idea was not new, as Holmes found. Charles White of Manchester in 1773 and Alexander Gordon of Aberdeen in 1795 had expressed the same conviction. Other physicians after them had voiced the same opinion and advocated precautions, but the standard texts and the leading obstetricians ignored or denied the fact. To Holmes, the fact was so obvious that he could not regard the matter of contagiousness as debatable: "I would not consent to make a *question* of a momentous fact which is no longer to be considered as a subject for trivial discussion, but to be acted upon with silent promptitude."(11)

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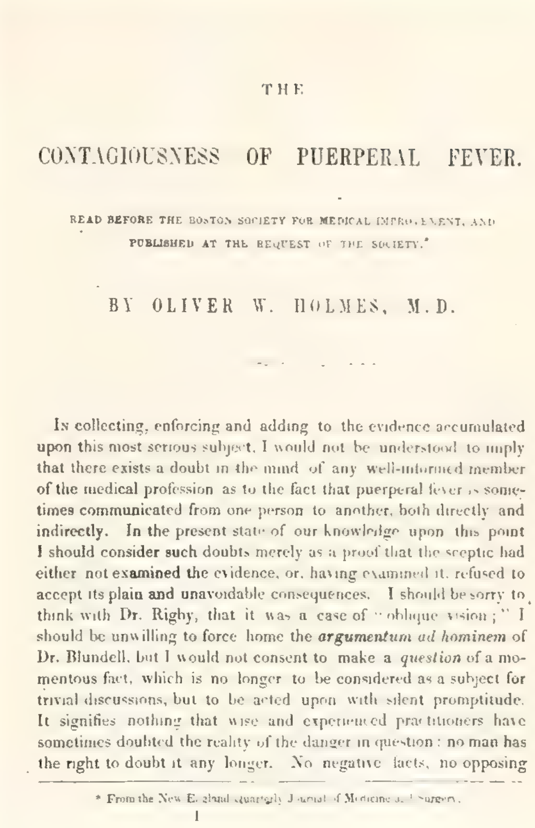
*Miss Tilton has just completed a new biography of Oliver Wendell Holmes which is on the fall book list of Henry Schuman, Inc.

1. The manuscript records of the Boston Society for Medical Improvement owned by the Boston Medical Library, are the source for this information. These records will be hereafter referred to as BSMI. The quotation is from BSMI 3:25 (Feb. 13) 1837.
2. Boston M. & S. J. 26:191 (Apr. 27) 1842.
3. Holmes, O. W.: Writings, Riverside Edition, Boston, 1891 (hereafter Works) 9:xvi.
4. BSMI 4:221.
5. Records of the Boston Athenaeum, ms., Boston Athenaeum.
6. BSMI 4:217-8. For Channing's earlier reports, June 27 and Nov. 28, 1842, see BSMI 4:167-8, 205.
7. BSMI, 4:190. Fisher's report is quoted by Dr. Henry R. Viets: A Mind Prepared, Bull. Med. Lib. Assoc. 31:222-3 (Oct.) 1943.
8. Holmes, O. W.: Medical case book for 1843, ms., Holmes Collection, Houghton Library, Harvard University.
9. Quarterly Summary Trans. Coll. Phys., Phila. 1:50-61 (May-July) 1842.
10. Med. Exam. (Phila.) 6:3 (Jan. 21) 1843.

In his famous essay, Holmes plays not the roles of doctor and scientist, but those of prosecuting attorney and judge, marshalling the evidence, delivering the charges, and passing the sentence. The etiology, the morphology of the disease interest him not at all. It is the one fact—that the obstetrician himself is culpable—that he seeks to demonstrate. And no jury could fail to render a verdict of guilty:

> "There is no tone deep enough for regret, and no voice loud enough for warning . . . God forbid that any member of the profession to which [a woman] trusts her life, doubly precious at that eventful period, should hazard it negligently, unadvisedly, or selfishly."(12)

Moved by his eloquence and impressed by his evidence, the members of the Boston Society for Medical Improvement voted that Dr. Holmes be requested to publish his paper(13). A vehicle for publication was at hand in the society's recently founded periodical, *The New England Quarterly Journal of Medicine and Surgery.* In the April issue appeared Holmes's essay(14). But the society was a small, local club; however valuable its activities were to individual members, its doings would not attract much attention outside Boston. Its periodical, which had only a small circulation, and a few offprints from it (fig. 1) were the only means by which Holmes's arguments were disseminated in their entirety. A much less persuasive argument than the original essay was the two-page abstract in the July issue of *The American Journal of the Medical Sciences*(15).



THE

CONTAGIOUSNESS OF PUERPERAL FEVER.

READ BEFORE THE BOSTON SOCIETY FOR MEDICAL IMPROVEMENT, AND PUBLISHED AT THE REQUEST OF THE SOCIETY.*

BY OLIVER W. HOLMES, M.D.

In collecting, enforcing and adding to the evidence accumulated upon this most serious subject, I would not be understood to imply that there exists a doubt in the mind of any well-informed member of the medical profession as to the fact that puerperal fever is sometimes communicated from one person to another, both directly and indirectly. In the present state of our knowledge upon this point I should consider such doubts merely as a proof that the sceptic had either not examined the evidence, or, having examined it, refused to accept its plain and unavoidable consequences. I should be sorry to think with Dr. Rigby, that it was a case of "oblique vision;" I should be unwilling to force home the *argumentum ad hominem* of Dr. Blundell, but I would not consent to make a *question* of a momentous fact, which is no longer to be considered as a subject for trivial discussions, but to be acted upon with silent promptitude. It signifies nothing that wise and experienced practitioners have sometimes doubted the reality of the danger in question: no man has the right to doubt it any longer. No negative facts, no opposing

* From the New England Quarterly Journal of Medicine and Surgery.

1

**Fig. 1. The opening page of an offprint of Holmes's classic article, "The Contagiousness of Puerperal Fever" (1843). (Editor's collection)**

It was this abstract rather than the original which provoked comments — among others, that of the Registrar-General of Great Britain, William Farr. Reviewing Farr's *Fifth Annual Report,* Holmes was pleased to find his ideas approved and praised, although regretful that the abstract had led Farr to say that he had not gone far enough(16). In 1852, Copland's *Medical Dictionary* took up the argument *for* contagion, giving credit to Holmes's essay and reprinting his conclusions.

For about a dozen years, however, the question of whether or not the disease was carried from patient to patient by negligent doctors remained a matter of debate. American textbooks of obstetrics continued to deny the contagiousness of the disease. A little over a year after Holmes read his paper, Dr.

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11. Works 9:128-9. See Heaton, Claude E.: Control of Puerperal Infection in the United States. Am. J. Obst. & Gynec. 46:479-486 (Oct.) 1943.
12. Works 9:167.
13. BSMI 4:223.
14. New England Quart. J. Med. & Surg. 1:503-30 (Apr.) 1843.
15. Am. J. M. Sc., n.s., 6:260-2 (July) 1843.
16. Holmes, O. W.: Medical Statistics, ms., n. d. (1846), Holmes Collection.

Channing (who had not been present on February 13, 1943) declared: "From his own experience he would never hesitate to visit other patients and to take charge of women in labor, when attending puerperal cases as a consulting physician."(17) In 1849 the subject was still open enough to warrant the Massachusetts Medical Association's appointing a committee of obstetricians to investigate it(18). The strongest counterattack came from two Philadelphia physicians. In 1852, Dr. Hugh L. Hodge, professor of obstetrics in the University of Pennsylvania, published a volume *On the Non-Contagiousness of Puerperal Fever.* In 1854, Dr. Charles D. Meigs included in his book, *Childbed Fevers,* a long attack upon the concept of contagion; he had always preferred to attribute the many deaths from puerperal fever to "Providence."(19) Both Hodge and Meigs were abusive in their allusions to Holmes. The fourth of Meigs's papers, directed entirely against Holmes, described his essay as among "the jejeune and fizzenless dreamings of sophomore writers."(20) The obstetrician refrained from giving the title of the essay and referred to Holmes by name as little as possible, as if he feared to advertise his enemy. "How the hungry heads of that Hydra keep shouting out!" justly observed one of Holmes's friends, when he wrote to beg a copy of the already rare essay, that he might have ammunition against the Philadelphians(21).

To Holmes the fact that the doctrine he had advanced in 1843 was still treated as a *question* in 1855 was sufficient reason for reprinting the original essay, under the meaningful, if cacophonous, title, "Puerperal Fever as a Private Pestilence." He knew that Meigs and Hodges were "sure to be listened to, not only by their immediate pupils, but by the profession at large."(22) Significantly, Holmes addressed the introduction of his reprint to medical students; not without sarcastic intention, he wrote:

> "I had rather rescue one mother from being poisoned by her attendant, than claim to have saved forty out of fifty patients to whom I had carried the disease. Thus I am willing to offer this paper once more to the press. The occasion has presented itself, as will be seen, in a convenient if not flattering form."(23)

At the art of polite insult, Dr. Holmes was considerably more adept than his opponents.

At the close of his introduction, Holmes unleashed all his powers of eloquence:

> ". . . let it be remembered that this is no subject to be smoothed over by nicely adjusted phrases of half-assent and half-censure divided between the parties . . . Let it be rememberd that persons are nothing in this matter; better that twenty pamphleteers be silenced, or as many professors unseated, than that one mother's life should be taken . . . Indifference will not do here; our Journals and Committees have no right to take up their pages with minute anatomy and tediously detailed cases, while it is a question whether the 'black death' of child-bed is to be scattered broadcast by the agency of the mother's friend and adviser. Let the men who mould opinions look to it; if there is any voluntary blindness, any culpable negligence, even in such a matter, and the facts shall reach the public ear; the pestilence-carrier of the lying-in chamber must look to God for pardon, for man will never forgive him."(24)

After such an appeal, no unprejudiced reader could ignore the facts set forth so abundantly in the essay itself. The 1855 publication was promptly acknowledged in an enthusiastic review in *The American Journal of the Medical Sciences*(25). Dr. Walter Channing changed his mind and wrote a paper confirming Holmes's views(26). A year later, another obstetrician remarked that the contagiousness of puerperal fever was now generally admitted: "there are those in other sections of the country who deny its contagion—but they have been nearly silenced by the masterly essay of Dr. Holmes."(27) In the same year the American Medical Association added the essay to its list of recommended titles(28). When Meigs in the 1857 edition of his *Obstetrics* stubbornly clung to his error, he was rebuked by a reviewer(29), who cited as the final authority on the subject—Dr. Oliver Wendell Holmes.

ELEANOR M. TILTON

17. BSMI 5:329.
18. Boston M. & S. J. 40:274-5 (May 9) 1849.
19. Meigs, C. D.: Obstetrics: The Science and Art, ed. 2, Philadelphia, Blanchard & Lea, 1852, p. 631.
20. Meigs, C. D.: On the Nature, Signs, and Treatment of Childbed Fevers, Philadelphia, Blanchard & Lea, 1854, Letter IV, p. 113.
21. Elisha Bartlett to Holmes, autograph letter, Dec. 3, 1852, Holmes Collection.
22. Works 9:126-7.
23. Works 9:106.
24. Works 9:127-8.
25. Am. J. M. Sc., n. s., 29:159-62 (Apr.) 1855.
26. Boston M. & S. J. 52:293-9 (May 17) 1855.
27. Boston M. & S. J. 54:81 (Feb. 28) 1856.
28. Trans. Am. M. Assoc. 9:372, 1856.
29. Boston M. & S. J. 55:490 (Jan. 15) 1857.

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**On the whole, the doctors I have known** have been, I think, the finest men of my acquaintance. I may have been very fortunate, but that has been my experience. And I am thinking not only of their great skill—though I think I should think even more of them if they had discovered how to prevent and how to cure a common cold—but also I have found them always the kindest and wisest friends. —Dean Inge (1933)

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## RACES VS. INDIVIDUALS

The miscarriage of justice which resulted in the acquittal of the twenty-six members of a lynching mob at Greenville, South Carolina, shocked the nation. It is true that the Negro who was lynched had murdered a taxi driver, but there is little doubt that he would have paid the full penalty for his crime had he been tried by a jury recruited from the vicinity of Greenville.

The complacency of North Carolinians who were somewhat smugly recalling the years that had elapsed since a lynching took place in this state was rudely shattered by the news that a Negro in Rich Square, suspected on rather flimsy evidence of attempted rape, had been taken by a mob from the custody of a jailer whose resistance was of the most passive type. Fortunately the members of the North Carolina mob were amateurs or were badly out of practice, for the prisoner escaped and later gave himself up to the sheriff. It was only their bungling that saved the Rich Square mobsters from the crime of mass murder.

The great majority of Southerners deplore lynch law as much as do the people of any other part of the country. It is a great mistake to hold all members of either race responsible for the crimes of individuals. Certainly the attorney for the Greenville taxi drivers offended decent citizens of the South as well as of the North when he spread the bedraggled banner of White Supremacy over the hoodlums who so brutally killed Willie Earle. On the other hand, it is to be hoped that some of the decent citizens of New York resented having the mother of Willie Earle address a mass meeting in Madison Square Garden. After all, Willie, as well as the mobsters, was guilty of a brutal murder. Many years ago that philosopher of the comics, Abe Martin, said something to the effect that people nowadays have so much sympathy for murderers that they are beginning to snub the victims' families. Let us hope that in their sympathy for Willie Earle, the people of New York will not despise Mrs. Brown, the widow of the taxi driver whom he murdered.

Mr. Vernon D. Strickland, in the *Roanoke-Chowan Times*, has said that the Negro criminal has no more sympathy from the colored people of Rich Square than from the white people, and that "there is no section in our country where cooperation, peace, tolerance and good will is more practiced and lived than here between and among the two races."

The same thing can be said of most sections of North Carolina. Let us hope that a few criminals of either color will not succeed in destroying the excellent relations between the two races.

## OUR STATE MEDICAL SOCIETY AND PINEHURST

At the 1946 meeting of the Medical Society of the State of North Carolina, the House of Delegates voted to return to Pinehurst for the 1947 meeting. It was a distinct surprise—and something of a shock—when the manager of the Carolina Hotel notified Secretary Roscoe McMillan that the Society would have to look elsewhere for a meeting place. All efforts to find accommodations for the Society within the state were in vain, and Secretary McMillan was forced to make arrangements for the meeting to be held at Virginia Beach.

There have been numerous rumors in circulation as to the reason for this refusal on the part of the Carolina management to play host to the Society. The most persistent one is that the behavior of many of the doctors was responsible: that there was too much drinking; that hotel property was wantonly destroyed; that many doctors left without paying their hotel bills; and that some valuable pictures were stolen from the hotel rooms.

In an effort to learn whether these rumors had any basis in fact, President Frank Sharpe (then president-elect) interviewed Mr. Richard Tufts, owner of the Carolina Hotel, and Mr. Fitzgibbon, the manager. The letters subsequently exchanged between Dr. Sharpe and Mr. Tufts are published below.

May 17, 1947

Dear Mr. Tufts:

At the recent meeting of the North Carolina Medical Society, which was held at Virginia Beach, there were still rumblings about the report which had spread over our state insinuating that our Society was not wanted at The Carolina, because of misbehavior on the part of some of its members.

You will recall our conversation in this connection, and that you assured me this was incorrect, but that you were unable to entertain us this year because of previous commitments and the fact that your help was leaving earlier than usual for their work at a summer resort. This also was the reason given me by Mr. Fitzgibbon, Manager of The Carolina.

Will you be kind enough to give me a statement substantiating this so that it may be published in the **North Carolina Medical Journal**?

With my best wishes.

Sincerely yours,
Frank A. Sharpe, M.D.

May 20, 1947

Dear Dr. Sharpe:

Thank you for your kind letter of the 17th. We appreciate your writing so frankly in regard to the rumors which have been circulated concerning our reason for being unable to offer the North Carolina Medical Society a meeting date in Pinehurst this spring.

We are most anxious to dispose of these rumors as it is very disturbing to us to think that there has been any criticism on our part of the conduct of your members while in attendance at any of the meetings held here at Pinehurst. We have no criticism of this sort to make and there is consequently no foundation whatever for the rumor.

As I have previously explained to you, we were compelled to cut our convention schedule short this spring because of the early opening of one of the summer resorts where the majority of our employees go for the summer season. This cut considerable time off our usual convention schedule and much to our regret we have found it necessary to cut in half the number of meetings we had the pleasure of welcoming to Pinehurst in the spring of 1946.

In deciding which groups we would give preference to we adopted the policy of offering first choice to those who best fitted the capacity of the hotel and who also seemed disposed to make their meeting in Pinehurst an annual fixture. In the case of the Medical Society you will recall that your meetings have grown to such an extent that the facilities available here in Pinehurst are severely taxed. This reason plus the fact that your practice of using booths in the lobby of the hotel has resulted in quite a little damage to the property constituted our only reasons for the selection of other groups in filling our abbreviated schedule.

I sincerely hope that this information will dispose of these very unfortunate rumors which have no foundation in fact whatever and want to thank you again for your thoughtfulness in writing.

Sincerely yours,
Richard S. Tufts

It is gratifying to note that Mr. Tufts denies emphatically that the conduct of the doctors of North Carolina was responsible for the management's refusal to allow the Medical Society to meet in the Carolina this year. It is highly probable that the real obstacles to the Society's holding its annual sessions there will be removed before next year. Mr. Tufts was reasonably sure that the resort which has been employing the Carolina staff during the summer months will open later next year, so that the hotel's employees will not be lured away before the convention season is over. An effort is being made to make some arrangement whereby the exhibits will be accessible to all visitors, and yet will not fill the hotel lobby.

It is at least reasonably certain that the Medical Society of the State of North Carolina will hold its 1948 meeting somewhere in the state. While Tar Heel doctors are grateful to their Virginia neighbors for their hospitality, they have too much state pride to wish to leave North Carolina for two years in succession.

## THE RESISTANT QUALITIES OF THE GASTRIC MUCOSA

Was it not Artemus Ward who said that he did not mind his ignorance so much as he did knowing so many things that weren't so? Nobody can appreciate the aptness of this statement more than the medical man. A brief article by Wolf and Wolff in the *New York State Journal of Medicine* for November 15(1) bowls over another long-cherished medical belief.

As is now well known, these authors have had the opportunity to study a modern Alexis St. Martin—a patient with a large gastric fistula. One of the most interesting observations they have made is that the gastric mucosa is far more resistant to irritating substances than is the skin. For example, 50 to 100 per cent alcohol produced a moderate erythema on the skin, but none at all on the mucous membrane of the stomach. Mustard produced a violent erythema of the skin, but only a moderate reaction on the gastric mucosa. "Such so-called gastric irritants as digitalis, ammonium chloride, ferrous sulfate, sulfonamides, aminophyllin, and so forth, are not irritants at all."

Even the time-honored emetics—copper sulfate and ipecac—induced no nausea when applied directly to the stomach lining. "The copper sulfate caused a precipitation of gastric mucus and on areas inadequately supplied with mucus, a slight edema and minute hemorrhages, but no nausea . . . Ipecac was found to cause no local change whatever . . ." Nausea was not induced until after these substances passed into the duodenum. "Whether nausea then resulted from local irritation of the duodenum or because of the effects of absorption of the drug or both is not clear."

This immunity of the gastric mucosa to irritation is ascribed to the fact that "the layer of slimy mucus which invests the stomach at all times protects it entirely from the action of irritants which cause erythema and blistering when applied to the skin of the forearm."

Even though we must revise our ideas concerning the effect of alcohol on the gastric mucosa, the prohibitionists may take comfort from the fact that no one has disproved its obvious effect upon the central nervous system. And, regardless of their *modus operandi*, ipecac and mustard will probably remain standard emetics for some time to come.

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## CONFUSING THE CAROLINAS

Some years ago, when a native son of North Carolina died after he had moved to New York and become famous, a number of New York papers gave South Carolina as the state of his birth. A Tar Heel editor, in commenting upon the frequency with which Northern writers confuse North and South Carolina, said he could forgive them much if they would even occasionally speak of Bob Reynolds as the senator from South Carolina.

The latest case of confusion between the two Carolinas occurred in an article by Dr. Homer L. Nelms, published in the *New York State Journal of Medicine* for April 15. This article, entitled "Is General Practice Becoming a Specialty?", is full of good common sense, and deserves to be read by all doctors. Two statements, however, should be corrected. One is that "in 1946 the American Medical Association for the first time conducted a Section on General Practice." It is true that in 1946 the Section on General Practice held its first sessions after it had been officially adopted into the A.M.A. family; but in 1943 and 1944 trial "Sessions for the General Practitioner" were held under the Section on Miscellaneous Topics. The 1945 meeting of the American Medical Association was called off by order of the O.D.T.

Dr. Nelms made his most serious mistake, however, when he said that "In 1936 the South Carolina Medical Society created a Section on General Practice. Ten other state societies have since done likewise." The Medical Society of the State of North Carolina, and not the South Carolina Medical Society, deserves credit for the first Section on General Practice.

Fortunately, Bob Reynolds is no longer in the Senate; and if Dr. Nelms will agree to forget that he ever represented North Carolina, and will further promise not to credit his able successor, Senator Clyde Hoey, to South Carolina, Tar Heel doctors will try to forgive him for his slight to their native state.

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1. Wolf, Stewart and Wolff, Harold G.: Action of Drugs and Various Chemical Agents on the Gastric Mucosa and Gastric Function in Man, New York State J. Med. 46: 2509-2512 (Nov. 15) 1946.

# Clinicopathologic Conference

BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

### *Presentation of Case*

A 3-month-old male infant was admitted to the North Carolina Baptist Hospital on February 21, 1947, with a chief complaint of cyanosis since birth. This was most marked over the face, head, hands and feet. An x-ray of the chest made soon after birth showed the heart to be slightly larger than normal. He received one x-ray treatment for questionable enlargement of the thymus, but there was no improvement in the cyanosis. The cyanosis, which never disappeared, became worse when the baby cried.

The child gained 15 ounces the first month, 7 ounces the second, and 1 ounce the third. Four weeks before admission to this institution he was hospitalized elsewhere for seven days because of an upper respiratory infection. Treatment consisted of penicillin and oxygen. An x-ray of the chest showed that the heart had increased in size. Since that time he had been increasingly irritable, and the degree of cyanosis had increased. For the four days prior to admission the irritability had been even worse, and the infant cried most of the time. He was admitted for study and possible surgery.

*Physical examination*: The temperature was 98 F., the pulse 168, respiration 80, blood pressure 74 systolic, 30 diastolic. The circumference of the head was 15½ inches, that of the chest 13½ inches; the child's length was 23½ inches. He was a poorly developed, fairly well nourished 3-month-old male in acute respiratory distress, crying most of the time. There was generalized cyanosis, most marked about the mouth, nose, and nailbeds. The head was symmetrical, with flattening at the posterior fontanel. The anterior fontanel was 6 by 6 cm., and the posterior 3 by 3 cm.; neither was bulging. The pupils were round, regular, and equal; both reacted to light. There was marked retraction of the interspaces on inspiration, and the baby seemed to gasp for breath. The lungs were clear to percussion and auscultation. The left border of the heart extended 1 cm. outside the midclavicular line. The rhythm was regular. There was a grade 3 to-and-fro murmur over the entire precordium, loudest at the fourth interspace to the left of the sternum. The liver was palpated 1.5 cm. below the right costal margin. There was no clubbing of the fingers or toes. The rest of the examination was not remarkable.

*Accessory clinical findings*: The hemoglobin was 17.2 Gm., the red blood cell count 5,900,000, the white blood cell count 7,600, with 29 per cent segmented polymorphonuclears, 2 per cent non-segmented, 2 per cent eosinophils, 64 per cent lymphocytes, and 3 per cent monocytes. The urine showed a trace of albumin and sugar; there were 3 to 4 granular casts and 3 to 5 white blood cells per high powered field, in a centrifuged specimen. The electrocardiogram revealed a wandering pacemaker in the auriculoventricular node, and right axis deviation; the changes indicated myocardial disease. The abnormal findings on fluoroscopic and x-ray examination were dilated pulmonary vessels, marked cardiac enlargement with predominant enlargement of the right ventricle, absence of the aortic shadow on the left, and absence of the pulmonary conus.

An operation was scheduled. The baby nursed poorly and cried most of the time in the hospital. On the second day his respirations became more labored and the cyanosis more marked. He took his formula at 9 p.m., but suddenly stopped breathing two and a half hours later.

### *Discussion*

DR. ROBERT B. LAWSON: In addition to the cyanosis of congenital heart disease, a newly born infant may show cyanosis due to poor aeration of the lungs, which may be caused by primary abnormality of the respiratory passages, or may be secondary to an intracranial lesion. Cyanosis on a respiratory basis is usually differentiated from that due to congenital heart disease by the changes that occur during crying. Crying causes the child to hyperventilate, and at the same time increases the work of the heart. For this reason, if the cyanosis is on a respiratory basis, the cyanosis will clear to some extent when the child cries; if it is due to a congenital cardiac defect, the cyanosis increases as it did in this case. Other bizarre causes of cyanosis, such as that due to an infant's drinking well water with a high nitrite content, do not need to be considered in this case. Although this infant was given roentgen therapy for a questionable enlargement of the thymus, enlargement of the thymus is a rare cause of cyanosis, and practically never causes continuous cyanosis.

The course of this infant's development is quite consistent with congenital heart disease. There is a fairly satisfactory gain in the first month of life, but as the infant becomes more active, the cardiac defect becomes greater, and the weight gain becomes less and less satisfactory. As the child's air hunger increases, it is noted that he becomes irritable and restless.

Physical examination revealed abnormalities in two different systems. The abnormality in the skeletal system is of relatively little importance here. The head was large for his age, and was particularly large when compared with the circumference of the chest. There was flattening about the posterior fontanel, and the posterior fontanel was widely patent, whereas it should be closed at this age. The anterior fontanel was also large, but there is no mention of craniotabes. The retraction of the interspaces on inspiration may have been due to a softening of the thorax. Although it would be unusual to find rickets in a child this young, it is quite possible that there was an associated rickets in this infant. The large head with the wide-open fontanel could have been on the basis of a mild degree of hydrocephalus, however.

The most important findings in this infant relate to the heart, which showed marked enlargement, particularly of the right ventricle, together with considerable narrowing of the shadows produced by the great vessels. A loud to-and-fro murmur was heard over the precordium. The liver was enlarged. The child was obviously in cardiac failure.

The accessory clinical findings were consistent with a congenital cardiac defect, showing the marked increase in the hemoglobin and red cell count that one expects when the blood tries to compensate for a mixture of unoxygenated blood with oxygenated blood. The differential diagnosis is rather quickly narrowed down to those types of congenital cardiac defects which are associated with continuous cyanosis. We do not need to consider the acyanotic group of congenital cardiac defects, such as dextroposition and coarctation of the aorta. Nor do we need to consider that group of defects associated with intermittent cyanosis, which occurs during peripheral collapse or when the intrathoracic pressure increases so that the pressure in the right side of the heart becomes greater than the pressure in the left side. In such an instance there would be a right-to-left shunt of blood which would cause cyanosis only occasionally. In most cardiac defects the blood shifts from the left to the right, increasing the load on the left side of the heart but not producing cyanosis. Such defects would be uncomplicated interauricular or interventricular septal defects, or uncomplicated patent ductus arteriosus.

In this case we are undoubtedly dealing with one of that group of defects which are associated with a continuous mixture of unoxygenated (venous) blood and oxygenated (arterial) blood. The most common of these defects is pulmonic stenosis, which is usually associated with dextroposition of the aorta, an interventricular septal defect, and an enlarged right ventricle to form the tetralogy of Fallot. A complex which is similar to the tetralogy of Fallot, but in which the pulmonary artery is dilated instead of being atrophied, is called Eisenmenger's syndrome. Other defects which may cause continuous cyanosis are the one-, two-, and three-chambered hearts caused by the complete lack of one or all of the cardiac septa. We have seen such a case on this service before; it was diagnosed as Eisenmenger's syndrome, but at autopsy showed a unilocular heart with a complete mixing of the venous and arterial blood. Another type of defect that may give rise to continuous cyanosis is complete transposition of the great vessels, in which the aorta leads out from the right ventricle and the pulmonary artery leads out of the left ventricle. Such a defect is incompatible with life for more than a very short time unless there are other defects, such as a patent ductus arteriosus, or a septal defect, which will allow shunting of the blood from the right to the left side of the heart.

It would seem that this case can be explained best on the basis of the tetralogy of Fallot. The x-ray evidence of enlargement of the right ventricle and the electrocardiographic evidence of right axis deviation, indicating obstruction to the outflow of blood from the right ventricle, would lead us to make a diagnosis of pulmonic stenosis. The narrowing of the great vessel shadow can be explained by dextroposition of the aorta, and the absence of the shadow of the pulmonary conus is common in pulmonic stenosis, since the diameter of the pulmonary artery is so much reduced. One can easily postulate the existence of a large interventricular defect to account for the cyanosis and the murmur which was described. It is true that the murmur in the tetralogy of Fallot is usually maximal at a higher point than in this case—usually in the second left interspace—and is usually systolic in nature. It is quite possible, however, that the murmur may be maximal at a lower point and may be to-and-fro, as in this case. There is some doubt in my mind that this murmur was actually systolic and diastolic, for it is very difficult to be sure about such a murmur with a heart rate of 168.

It is unusual to have a child with the tetralogy of Fallot expire this quickly. Ordinarily, patients with uncomplicated pulmonic stenosis and interventricular septal defect may live for many years, and go downhill very slowly.

It is possible that this child had a complete atresia of the pulmonary artery, associated with a patent ductus. Such a combination of anomalies would account for the clinical picture very well, and since this case is being presented at a clinicopathologic conference, I suspect that it is much more complicated than it sounds. I will stick with the law of averages, however, and offer as my diagnosis the tetralogy of Fallot, possibly with other cardiac anomalies.

*Dr. Lawson's diagnosis:*

1. Tetralogy of Fallot
2. Questionable hydrocephalus
3. Questionable rickets

Dr. J. P. Rousseau (Roentgenologist): On x-ray examination and fluoroscopy this child's cardiac silhouette was quite consistent with the tetralogy of Fallot. The chest film showed widening of the cardiac shadow, both to the right and left. By fluoroscopy, it was found that there was no posterior displacement of the esophagus—a fact which would imply that the left auricle was not enlarged. There was no roentgen evidence of enlargement of the thymus. The great vessels shadows were abnormally small, and the usual shadows of the aortic arch and pulmonary conus to the left of the sternum were absent. These findings are consistent with a diagnosis of the tetralogy of Fallot, which was the original roentgenologic impression, but could also be found with transposition of the great vessels.

Dr. Frederick R. Taylor: In order to explain the diastolic murmur here, is it not possible that this child had an associated tricuspid valve stenosis? I also feel that it is unusual for a child to die this soon from the tetralogy of Fallot.

Dr. Weston M. Kelsey: It was the opinion of the house staff and attending staff on this case that this child had pulmonic stenosis, but we were worried about his rapid demise. Although we felt that some other abnormality might be present, we did feel that exploratory surgery should be done in the hope that a Blalock operation might be performed. However, the child went downhill too fast to make this possible.

### *Anatomic Discussion*

Dr. W. C. Thomas: The circulatory system presented the interesting findings in this case, as one would expect. There was complete transposition of the great vessels. The aorta arose from the right ventricle, while the pulmonary artery arose from the left ventricle. The ductus arteriosus was patent, the lumen measuring about 2 mm. in diameter. There were no other abnormalities of the great vessels. There was a foramen ovale which measured 1 cm. in diameter. The dilatation of the left ventricle caused the predominance of this portion of the heart. The interventricular septum presented a defect which measured 3 mm. in diameter and was located in the base of the heart.

Sections through the lungs showed early bronchopneumonia.

*Anatomic diagnosis*

1. Complete transposition of the aorta and pulmonary artery with patencies of the ductus arteriosus, interauricular septum, and interventricular septum.
2. Bronchopneumonia.

### *Closing Discussion*

Dr. Lawson: This has turned out to be a most interesting case. Transposition of the great vessels would naturally be incompatible with life, since there would be no connection between the pulmonary and systemic circulations unless additional defects were present. In this case some shunting of blood could occur through the patent ductus arteriosus and through the interauricular and interventricular defects. The rapid decline in this infant did make most observers feel that some condition other than pulmonic stenosis might exist.

In view of the increasing interest in the surgical treatment of children with a patent ductus arteriosus and pulmonic stenosis, we must try to make more specific diagnoses than just "congenital heart disease." This case reminds us, however, that such specific anatomic diagnosis is not always easy.

## MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.

RALEIGH

DRUGLESS PRACTITIONERS: *"Penetration of tissues" by drugless practitioners is legal when it is done to secure information for diagnostic purposes. They may in certain instances prescribe drugs.*

This is an account of a case in which a drugless practitioner was charged by the Board of Medical Examiners with unprofessional conduct. There were many charges brought against the defendant, but only two were of medical interest. One accusation was that he "penetrated tissues" for the purpose of treatment, and the other charge was that he prescribed drugs. Both acts were specifically prohibited by the code of the state in which the suit was tried.

The evidence submitted was sufficient to satisfy the board that the defendant was guilty of the conduct alleged, and as a consequence they felt justified in revoking his license to practice the healing art.

The drugless practitioner thereupon appealed to the superior court, alleging that the hearing before the board was arbitrary and that he was not allowed to introduce certain legally relevant testimony. When this court sustained the findings of the board, the defendant sought redress before the Court of Appeals.

As to the first count, the appellate court was of the opinion that anyone engaged in the healing art should exert every effort to secure information for the purpose of arriving at a diagnosis, irrespective of the school of thought to which he belonged. The specific act here charged was that of securing one drop of blood for a hemoglobin determination. This could be done only for the purpose of aiding in making a diagnosis and not for treatment, and the court so held.

The other count charged the defendant with prescribing drugs for a patient — namely, "Min-a-rex" (a gland tablet) and "vitamin capsules." In this connection it should be mentioned that a chemist testified that the "Min-a-rex" or gland tablets were in reality a sea-water preparation, and that the vitamin capsules were food substitutes containing wheat-germ oil. Testimony also showed that the practitioner delivered the substances in the origial packages, without recommendation as to administration except the directions on the labels. It was held in this instance that there was no violation of the law, inasmuch as the preparations allegedly prescribed were not drugs, and if so were sold rather than prescribed.

The findings of the board and the superior court were reversed, and the appellate court ordered the license of the accused to be restored. The apparent unsoundness of such reasoning could perhaps be attributed to the failure of the prosecution to furnish the court with more detailed information concerning the dangerous potentialities of many diagnostic procedures. If allowed to go further, this line of thought might permit persons obviously untrained for such tasks to perform sternal punctures, obtain biopsy materials, carry out encephalographic studies, and perform many other diagnostic procedures which would entail great danger to the patient. As to the judgment rendered in the second charge, this can be dismissed with the statement that physicians consider any substance used for medicinal purposes to be drugs.

(District Court of Appeals, First District, Division 2, California, September, 1944. V. 20 Pacific (Second Series), p. 181)

### BOND-A-MONTH PLAN

The banks of North Carolina will cooperate fully with the Treasury Department in offering the Bond-a-Month plan to depositors. The Bond-a-Month plan, which will be inaugurated on a nation-wide scale beginning June 1, is a method whereby bank checking account customers may purchase one or more U. S. Savings Bonds, series E, F or G, monthly by authorizing the bank to charge their accounts with the cost. The bank makes the necessary entries, issues the bonds and mails them to the depositor each month without any charge for the service.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX June, 1947 No. 6

IT IS often overlooked that the ultimate control of tuberculosis will depend upon the effectiveness of the training given to the infected individual. Case finding in tuberculosis is of little value unless it is followed by treatment; to go to a sanatorium is not as important as to remain there until the disease is arrested; the permanence of the arrest in any case of tuberculosis is always a matter of personal discipline and vigilance. At every step of the road the physician must keep the conscious active cooperation of the patient. This comes about only when continuous education of the patient is carried on by the physician and those associated with him.

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## The Care and Education of the Tuberculous Patient in the Hospital

The care of a patient in any institution is dependent upon the physical facilities of the hospital or sanatorium; the proper balance of staff; and the quality of the staff. An adequate budget is necessary but money is not the entire answer. A well-equipped sanatorium may still be a cold, unsympathetic place. There must be an **esprit de corps** that starts at the top and carries through to every worker in the place.

The importance of a proper balance of staff is self-apparent. There must be enough physicians, enough nurses, a satisfactory dietetic service, enough social workers, enough rehabilitation workers, and enough accessory attendants to carry on the work properly.

The quality of the staff will depend upon the training, the experience and the personal interest of every person who takes part. Adequate salaries are necessary to attract and hold competent personnel.

Preemployment training and experience are desirable, and training should be continued throughout the period of employment. There should be frequent and regular staff conferences, not for the physician alone, but for the entire administrative group, the nurses, social workers, and rehabilitation workers. Not only medical and surgical treatment, but problems of discipline, emotional instability and psychological approaches should be discussed. The staff should all learn to think as a unit. As a result, when a physician advises a patient and the patient asks the same question of the nurse or the social worker, there will be agreement among them. Some may feel that only a doctor should discuss medical subjects, and that nurses, social workers, and others should always refer such questions to the doctor. That is true if the answers are difficult but no doctor ever loses prestige when his staff gives him informed backing and support.

In the treatment of tuberculosis the work of the doctor, the nurse, the social worker, and the rehabilitation worker so dovetail that they are frequently helping with the same thing. All four "practice medicine" in some way, whether it be in treatment, care, or maintaining the proper mental equilibrium of the patient. All four do a certain amount of nursing service. All four may be drawn into the domestic problems usually handled through the social worker. And all four take a part in rehabilitation. The direction and supervision of the work should be clean cut, but the better the understanding, the more effective will be the cooperation between staff members.

The care of the patient, then, does not depend upon physical facilities alone; it depends primarily upon the sympathetic understanding and cooperation of every person involved. This can only exist in a harmonious, well-trained, well-informed, interested, and intelligent staff.

The other half of the work is the education of the patient which is carried on through personal contacts of the staff, talks and lectures, books and periodicals on tuberculosis, sanatorium publications and visual aids of all kinds. The education of the patient starts with the day that the diagnosis is made. Then the first shock is received, and the patient's little world crumbles around him. Often he loses everything for which he has worked, saved, and planned. Usually he enters the sanatorium in a condition of mental chaos.

It is the job of every person who is in touch with this patient to sympathize, to help, to encourage, and to gain his confidence. The hope and assurance of recovery must be instilled, his family problems must be met, and his rehabilitation started at this time.

At first the patient is too stunned to appreciate or understand the rules of the game, but his education must start right at the beginning. It is important that the attitude of every staff member should be that of a teacher, giving the patient the hints and the rules which will be short cuts to recovery. Optimism should be the keynote.

When the first shock has worn off, the patient is in the mood to be a pupil in our school for tuberculosis. He will listen to other patients and get distorted ideas; he will listen to anyone and everyone. It is important, therefore, that his information be authentic. The lectures given, the books furnished, and the sanatorium publications all play an important part. If the staff is well trained, the questions can be intelligently answered. Each department head should take part of the responsibility for delivering talks and lectures.

The patient should be taught how tuberculosis develops, how it is diagnosed, and how it can be prevented. He should understand the different types of treatment and the objective of these treatments. He should be made to realize that his cure is within himself. He should be taught how the disease is spread and how to protect others. When this is done, we have reduced the hazard nearly 90 per cent. The patient should realize the importance of follow-up examinations long after discharge. He should know the length of time that it takes before he will be well, even after returning to a productive life. Too often the patient is discharged with a good prognosis from an institution, but because his education has been incomplete, he becomes careless and, as a result, his tuberculosis recurs.

The responsibility for patient education does not belong to doctors alone. It is the responsibility of every nurse, every social worker, and every rehabilitation worker who comes in contact with the patient. The sanatorium should not be a jail, but it should be a school for the education of the patient, and discipline is just as important as medication and treatment. A well-educated patient who leaves the sanatorium with consent, and is well on the road to recovery, seldom breaks down again. It is the careless patient who didn't learn the lesson who comes back to be readmitted.

**Let's Improve the Care and Education of the Tuberculous Patient in the Hospital, Howard W. Bosworth, M.D., Transactions of the National Tuberculosis Association, 1946.**

# BULLETIN BOARD

## INAUGURAL REMARKS

Frank A. Sharpe, M.D.

During the past year it has been my privilege to attend most of the meetings of this Society's Executive Committee and of its various subcommittees, and to observe closely the job which President Coppridge and Secretary McMillan have so ably done. I have traveled to many portions of our state and heard the various problems confronting us debated *pro* and *con* by strong, honest men—at times with no cool tempers.

I am frightened and amazed at the tremendous responsibility which is placed upon the shoulders of anyone who is entrusted with the duties which I am about to assume. Any personal feeling of ego or exultation at being given so high an honor is dispelled by the deep sense of duty which goes with it.

Armies, industrial health centers, public health work, and such organizations have, during the past few years, greatly depleted the ranks of those of us available to care for the home folks.

The halls of our Congress are daily alive with suggested plans of legislation to regulate our work and our lives. Within our own state, a comprehensive program has been evolved to answer the demands for better medical care. Large sums of money have been appropriated to improve our medical facilities. To attain the goal set before us, we must have an earnest, cooperative spirit existing between the Medical Care Commission on the one hand and those of us who are to deliver the medical care on the other. Honest, constructive criticisms should be welcomed—selfish jealousies outlawed. The great teaching centers in our state will, I am sure, join hands in a friendly spirit for success. We, as individuals, must do the same.

The relationship between the medical profession and the public needs improvement. We doctors are not a mysterious group, as so many believe us to be.

Many problems immediately confront us. Simply to meet once each year and review the problems of the organization is not enough. Your Executive Committee will meet at frequent intervals; notice of the time and place will be given in advance through the North Carolina Medical Journal. It is the duty of individual members or groups to bring before this committee their problems and suggestions, and we shall welcome them.

Let me thank you from the bottom of my heart for the high honor you have given me. With your help, I shall endeavor to serve you to the best of my ability.

## Eye, Ear, Nose and Throat Seminar

The second annual meeting of the North Carolina Eye, Ear, Nose and Throat Society and the South Carolina Society of Ophthalmology and Otolaryngology will be held at the Hotel Skyland in Hendersonville, North Carolina, on September 15, 16, 17 and 18. The first two days will be devoted to ophthalmology and the last two to otolaryngology. The following men will appear on the program:

**Ophthalmology**

Dr. Harold Brown, New York
Dr. John H. Dunnington, New York
Dr. Jack Guyton, Baltimore
Dr. Brittain F. Payne, New York

**Otolaryngology**

Dr. Edgar B. Burchill, New York
Dr. Louis H. Clerf, Philadelphia
Dr. Frederick A. Figi, Rochester, Minn.
Dr. Dean M. Lierle, Iowa City

Otolaryngologists and ophthalmologists from any other states are invited to attend.

Information about the course will be furnished by officers of either Society, whose names follow:

North Carolina Society:

Dr. V. K. Hart, president, Charlotte
Dr. W. E. Brackett, vice president, Hendersonville
Dr. J. A. Harrill, secretary-treasurer, Winston-Salem

South Carolina Society:

Dr. Ruskin G. Anderson, president, Spartanburg
Dr. S. Harry Ross, vice president, Anderson
Dr. Roderick Macdonald, secretary-treasurer, Rock Hill

## News Notes from the University of North Carolina

The following members of the faculty attended the Chicago meetings of the Federation of American Biological Sciences, May 16-23: Drs. K. M. Brinkhous and John B. Graham of the Department of Pathology, Drs. John H. Ferguson, A. T. Miller, and E. P. Hiatt of the Department of Physiology, and Dr. Fred W. Ellis of the Department of Pharmacology.

Dr. Brinkhous read a paper, "Clotting Defect in Hemophilia: Deficiency in a Plasma Factor Required for Thromboplastin Liberation from Platelets," before the meeting of the American Society for Experimental Pathology.

Dr. Ferguson presented a paper on "Tryptase (Plasmin) and Blood Coagulation" before a joint meeting of the Physiological and Pathological Societies.

Dr. Miller gave a paper, "The Excretion of the Blue Dye T-1824 in the Bile," before the American Physiological Society.

At the annual medical alumni luncheon at Virginia Beach on May 14, the following officers were elected for 1947-1948: Dr. A. H. London of Durham, president; Dr. M. D. Bonner of Jamestown, vice president; and Dr. Milton S. Clark of Goldsboro, secretary. The new president was authorized to enlarge the alumni visiting committee, which is to work in close cooperation with the Trustees' committee on the Medical School and the Dean in developing the plans for the School's expansion.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

On May 24 and 25 meetings were held at Charlotte Memorial Hospital, Charlotte, and the North Carolina Orthopaedic Hospital, Gastonia, at which trainees in the Orthopaedic Training Program at Duke University School of Medicine and other hospitals read medical papers to members of the orthopedic specialty and the personnel of the training program. Those who read papers from Duke are: Louis D. Britt, Ned M. Shutkin, Walter A. Hoyt, Ira N. Rapp, Julian B. Noel, Jack Hughston. Others included F. Payne Lee, John Baluss, both of Charlotte Memorial; George Sotirion, George B. Miller, and J. B. Carr, all of North Carolina Orthopaedic Hospital; Leonard J. Goldner and Ritchie Belser, Warm Springs Foundation; and Kearns Thompson and N. M. Roland, both of Shriner's Hospital.

This training program in orthopedic surgery has been established with the cooperation of the Warm Springs Foundation, Warm Springs, Ga., the North Carolina Orthopaedic Hospital, the Shriner's Hospital for Crippled Children, Greenville, S. C., Charlotte Memorial Hospital, and the orthopaedic division of the department of surgery at Duke. The training is on a competitive basis and all appointments are for one year. Fellowships are provided by the National Foundation for Infantile Paralysis. Engaged in the training are six first-year fellows, four second-year fellows, four third-year fellows, four fourth-year resident fellows, and one fifth-year resident fellow.

The personnel of the services participating in this program include: Dr. Robert L. Bennett, director of physical medicine, Warm Springs Foundation, Dr. Charles E. Irwin, Warm Springs; Dr. Oscar Miller and Dr. Julian E. Jacobs and associates, Charlotte Memorial Hospital; Dr. William M. Roberts and associates, North Carolina Orthopaedic Hospital; Dr. J. Warren White and associates, Shriner's Hospital; and Dr. Lenox D. Baker and Dr. Beverly Raney, Duke University School of Medicine.

* * * *

Dr. Frank Ober, formerly chief surgeon at the Peabody Home for Crippled Children, surgeon at the Boston Children's Hospital, and Professor Emeritus at the Harvard School of Medicine, visited the division of orthopaedic surgery at the Duke University School of Medicine in connection with his present work as representative of the fellowship committee of the National Foundation for Infantile Paralysis.

## NEWS NOTES FROM THE NORTH CAROLINA STATE BOARD OF HEALTH

Patients may receive all the information they need to teach them the vitamin value of foods by writing to the Nutrition Division of the State Board of Health, in Raleigh. The "Basic Seven" chart lists articles of food that are not only rich in essential vitamins, but are very prevalent and palatable.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

At the annual meeting of the board of directors of the State association in Goldsboro on May 1 the following new officers were elected: Dr. Hillis L. Seay, president; Dr. M. D. Bonner, vice president; T. W. Steed, treasurer; and Elizabeth Smith, secretary. New directors-at-large are Dr. H. Stuart Willis, Sanatorium; Edwin Pate, Laurinburg; Dr. C. D. Thomas, Black Mountain; D. Hiden Ramsey, Asheville; and Harry McMullan, Jr., Washington. The following were elected as new representative directors: Max B. Fogleman, Warren County; Mrs. L. B. Heffner, Buncombe County; Dr. C. G. Milham, Richmond County; J. Tracy Moore, Greensboro; Columbia Munds, New Hanover; and Mrs. Gordon Shuford, Catawba County.

* * * *

Latham L. Miller, director of program for the NCTA, has resigned to accept a position as executive secretary of the Community Chest and Community Council of Raleigh and Wake County.

* * * *

The American Trudeau Society, in cooperation with the University of Colorado School of Medicine, is conducting a post-graduate course in thoracic diseases in Denver from July 28 to August 9. Appearing on the faculty is Dr. David T. Smith, professor of bacteriology and associate professor of medicine at Duke University School of Medicine. Dr. Smith will discuss actinomycosis, blastomycosis, bronchiectasis, and fungus diseases in general.

* * * *

The High Point Tuberculosis Association held a health institute for colored professional workers on April 28. Dr. Howard M. Payne, chief physician, Tuberculosis Division of the Freedmen's Hospital, Washington, D. C., was the speaker. The institute was sponsored by the Negro planning committee of the High Point Tuberculosis Association.

## TENTH DISTRICT MEDICAL SOCIETY

The Tenth District Medical Society held its spring meeting in Asheville on May 28. Doctors participating on the program of the afternoon session were Dr. W. A. Sams of Marshall, Dr. George Rowe of Marion, Drs. C. N. Burton, S. L. Crow, Wallace R. Matthews, R. C. Nailling and Charles S. Norburn of Asheville, Drs. Thomas R. Nichols and L. W. Oehlbeck of Morganton, and Dr. Hugh A. Matthews of Canton. Guest speakers at the dinner meeting were Dr. E. A. MacMillan of Winston-Salem, Dr. Frank A. Sharpe of Greensboro, and Dr. Roscoe D. McMillan of Red Springs.

Dr. D. M. McIntosh of Old Fort is councilor of the Tenth District. Officers of the Society are Dr. B. O. Edwards of Asheville, Dr. F. O. Trotter of Hendersonville, Dr. Harry Miller of Murphy, Dr. A. E. Gouge of Bakersville, Dr. Harry Ditmore of Marshall, and Dr. D. M. McIntosh, Jr., of Marion.

## NORTH CAROLINA STATE PLANNING BOARD

The first comprehensive survey of all the service needs of North Carolina children and youth ever attempted was released recently by the State Planning Board Committee on Services for Children and Youth.

The twenty-eight page report, attractively printed in two colors and containing numerous illustrations, analyzes existing services in the fields of education, health, institutional care, employment regulations and income, recreation, and public welfare. Recommended remedies for the deficiencies indicated were cited as desirable goals toward which the state should strive.

## NEWS NOTES

Dr. John Donnelly died at his home in Charlotte on April 9.

* * * *

Dr. Lawrence Byerly Holt of Lexington was married to Dr. Norma Ware of Macon, Georgia, on December 28.

* * * *

Dr. Robert Glenn Holt of Lexington was married to Dr. Margaret Nelson of Lawrence, Kansas, on April 7.

* * * *

Dr. Harold C. McDowell has announced his return from military service and the opening of his office for the practice of orthopedic surgery in Winston-Salem.

## NOTICE OF CHANGE IN GENERAL QUALIFICATIONS FOR ELIGIBILITY TO THE EXAMINATION OF THE AMERICAN BOARD OF ORTHOPAEDIC SURGERY

All candidates applying for Part I of the examination of the American Board of Orthopaedic Surgery after January 1, 1951, must have the following general qualifications:

### General Qualifications

(a) He must be a citizen of the United States or Canada.

(b) He must be a graduate of a medical school approved by the Council on Medical Education and Hospitals of the American Medical Association. In the case of an applicant whose training has been received outside the United States or Canada, his credentials must be satisfactory to the Council on Medical Education and Hospitals of the American Medical Association and to the National Board of Medical Examiners; he must have been engaged in the practice of orthopaedic surgery in the United States or Canada for at least three years prior to submission of his application.

(c) He must have served an internship of twelve (12) months in a general hospital acceptable to the Board.

(d) **He must have spent a year on an approved surgical residency subsequent to the completion of his internship.**

NOTE: This change consists of an additional required year of surgical training before entering on special work in Orthopaedic Surgery.

No individual may apply for Part I of the examination of the American Board of Orthopaedic Surgery who has not completed at least one year in special orthopaedic training in addition to meeting the general requirements.

The Special Qualifications to fulfill the requirements for eligibility to both Part I and Part II of the examination will be furnished on request to the Secretary of the American Board of Orthopaedic Surgery.

The American Board of Orthopaedic Surgery
Dr. Francis M. McKeever, Secretary
1136 West 6th Street
Los Angeles 14, Calif.

## INTERNATIONAL COLLEGE OF SURGEONS

The twelfth annual assembly of the United States Chapter of the International College of Surgeons will be held at the Palmer House in Chicago, September 28-October 4.

## NATIONAL MENTAL HEALTH FOUNDATION

The membership of the National Mental Health Foundation, incorporated one year ago, has grown to nearly 3000, according to a report issued by Harold Barton, executive secretary, on the occasion of the Foundation's first birthday.

Anyone interested may join the Foundation as a voting member, with a voice in the direction of its activities, by payment of a $1 membership fee, to be mailed to the Foundation's national headquarters, 1520 Race Street, Philadelphia, Pennsylvania.

The Foundation is placing particular emphasis on public education to (1) give the public a basic understanding of mental afflictions in an effort to remove the stigma and superstition now surrounding mental handicaps; (2) publicize conditions and possibilities in public institutions; (3) mobilize public support for local, state and national efforts through active membership in a coordinated, nationwide, citizens' mental health movement; (4) provide public officials with reference material for planning effective legislative programs for prevention, treatment and care of mental disorders.

## NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The National Gastroenterological Association takes pleasure in announcing that First Prize in its 1947 Prize Award Contest for the best unpublished contribution on gastroenterology or an allied subject has been awarded to Dr. Frederic Duran-Jorda of Manchester, England. Dr. Duran-Jorda's paper on "Histo-Pathology of the Semi-Squamous Epithelial Layer as Found in the Colon" was selected by the Judges from among twelve entries received from all parts of the world.

## NATIONAL FOUNDATION OF INFANTILE PARALYSIS

Again during these summer months outbreaks of poliomyelitis are making their appearance in many sections of the country. Last year 25,191 cases occurred in the nation, 163 of them within this state. No one can forecast how many cases will occur this year or how badly the communities in this area will be affected. Medical science, unfortunately, cannot as yet prevent an epidemic or even one case.

In times such as these it is helpful to physicians to know that there are others prepared to share these troublesome burdens. In addition to making possible epidemic aid, education, and scientific research, the National Foundation for Infantile Paralysis is pledged to assist financially those patients who require such help. Through their generous contributions to the March of Dimes, the American people have made this possible. Hospital bills, salaries for physical therapists and nurses, purchase of special equipment, and the many other charges which may comprise the essentials of good medical care may be paid for by the chapters of the National Foundation when necessary. Local chapters of the National Foundation are scattered throughout the United States. There are chapters in each of North Carolina's one hundred counties. The local health department can furnish the address of the nearest chapter.

Physicians are urged to be more diligent in reporting all cases of poliomyelitis or suspected poliomyelitis to the health officer, so that every precaution may be taken to prevent its spread.

BULLETIN BOARD CONTINUED ON PAGE 386

# AUXILIARY

## THE TWENTY-FOURTH ANNUAL MEETING

The Auxiliary to the Medical Society of the State of North Carolina met at Virginia Beach in May, with headquarters at the Cavalier Hotel. Registration was on Monday, May 12. Mrs. Millard Hill, chairman of social activities, had planned for the first evening music in the lobby of the hotel, followed by a bridge party in the Panorama Room of the Beach Club. The following morning at 9, the Board of Directors met, and at 10:30 the general meeting was opened, with Mrs. Frederick Taylor of High Point presiding. Past presidents who were welcomed were: Mrs. P. P. McCain, Southern Pines, 1923-24; Mrs. B. J. Lawrence, Raleigh, 1928; Mrs. G. H. Macon, Warrenton, 1930; Mrs. K. B. Pace, Greenville, 1944; Mrs. Eric Bell, Wilson, 1946. Mrs. E. C. Judd of Raleigh, who has been treasurer of the Auxiliary for many years, was absent because of the commencement at the State School for the Blind, where she is a teacher.

Dr. Coppridge, president of the Medical Society, was presented. He gave a resume of what the Society has done for medical care in North Carolina. He urged education of the public through the help and intelligent cooperation of doctors' wives. The new officers were then installed by Dr. Rachel Davis. Prizes won by county and district auxiliaries were announced as follows:

1. The prize contributed by Mrs. F. R. Taylor for 100 per cent dues paid was won by the Hoke County Auxiliary.
2. The prize contributed by Mrs. P. P. McCain for the largest contribution to the McCain Endowment Fund was won by Guilford County.
3. The prize contributed by Mrs. G. M. Billings for the largest contribution to the Stevens Endowment Fund was won by Buncombe County.
4. The prize contributed by Mrs. M. D. Hill for the largest contribution to the Cooper Endowment Fund was won by the Edgecombe-Nash Auxiliary.
5. The prize contributed by Mrs. B. W. Roberts for the largest contribution to the Student Loan Fund was won by Guilford County.
6. The achievement prize, a silver loving cup and $25.00 contributed by Dr. Rachel Davis, was won by the Eighth District.

One particularly welcomed face at this meeting was that of Mrs. P. P. McCain. She attended her first medical meeting as a little girl with her father in 1908, and has missed few meetings since. In 1923 she was a leader in organizing the Auxiliary; she was its president in 1923-1924. Her medical record is unique: her father, Dr. McBrayer, was secretary of the State Medical Society; her brother, Dr. Reuben McBrayer, was a colonel in World War II; her husband, Dr. P. P. McCain, director of the State Tuberculosis Sanatoria, was killed in an automobile accident in November on a mission for the State Medical Society; her daughter, Irene, is a senior medical student at the University of Pennsylvania; her son, John, is a premedical student and expects to enter the University of North Carolina Medical School in the fall of 1948; her youngest daughter, Jane Todd, is a student at Agnes Scott, and at present plans to be a medical librarian. Governor Cherry has appointed Mrs. McCain on a special committee from the Board of Trustees to work with the medical school.

Tuesday afternoon at 4, a tea was given in the Hunt Room honoring our president, Mrs. Taylor; Mrs. William M. Coppridge, wife of the president of the Medical Society; Mrs. Roscoe D. McMillan, wife of the secretary-treasurer of the Medical Society; Mrs. W. Reece Berryhill, president-elect; Mrs. Frank A. Sharpe, wife of the president-elect of the Society; Mrs. Stuart Willis, wife of the superintendent of the three State Tuberculosis Sanatoria; and other guests of the Society.

At 7 that evening, members and their wives were entertained at a banquet in the dining room and ball room of the Cavalier. The President's Ball followed at the Beach Club.

The next morning those who could stay for another social hour were entertained at a Coca-Cola party at 10:30. After this, bags were packed and goodbyes were said. Once more doctors and their wives turned their faces toward home and another year's work, before meeting friends again at the next annual meeting.

Mrs. C. C. Carpenter,
*Chairman of Press and Publicity*
Winston-Salem

# BOOK REVIEWS

**Principles and Practice of Obstetrics.** By Joseph B. DeLee, M.D., Late Professor of Obstetrics and Gynecology, the University of Chicago; Consultant in Obstetrics, the Chicago Lying-in Hospital and Dispensary; and J. P. Greenhill, M.D., Attending Obstetrician and Gynecologist, the Michael Reese Hospital; Obstetrician and Gynecologist, Associate Staff, the Chicago Lying-in Hospital; Chairman Dept. of Gynecology, Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. Ed. 9. 1011 pages; 1108 illustrations on 860 figures, 211 in color. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1947.

This comprehensive textbook follows previous editions in outline and content, but is brought up to date by the addition of new subjects and new illustrations. The first half of the book deals with physiology and the latter half with pathology. The subject matter is divided into twelve sections and seventy chapters.

New chapters on erythroblastosis, care of premature infants, circumcision, and minor disturbances of pregnancy are included. The last subject necessarily introduces controversial methods of management. The author's regimen for the treatment of trichomonas vaginalis is quite vigorous and possibly should have been accompanied by a warning against the use of tampons and douches in certain stages of pregnancy. The chapter on erythroblastosis is concise and well presented. Care of premature infants is dealt with briefly, but the important features are well covered. The chapter on acute infectious diseases in pregnancy has been expanded to include typhoid fever, chorea gravidarum, German measles, scarlet fever, and meningitis.

The chapters dealing with physiology and with complications of pregnancy, labor, and the puerperium set forth sound principles found in the reliable textbooks on this subject. Throughout this volume one is impressed by the author's fairness and lack of personal prejudice. This virtue is carried almost to a fault at times, as in the author's detailed discussion of the use of a Voorhees bag in the management of placenta praevia—a practice to which he does not personally ascribe. Likewise, a confusing number of methods for management of the third stage of labor are described.

One of the best chapters in the text is the one dealing with toxemias of pregnancy. The differential diagnosis, etiology, pathology, treatment, and prognosis are presented with unusual clarity, although only twenty-five pages are devoted to this subject.

With the exception of those dealing with extraperitoneal cesarean section, the illustrations, including several new ones, are well chosen, well reproduced, and are quite helpful in supplementing the text.

This textbook remains one of the best-written, most practical, yet most comprehensive contributions to obstetric literature. It will continue to be of great value to student, to specialist, and to general practitioner.

**The National Formulary**, Ed. 8. 850 pages. Price, $7.50. Easton, Pennsylvania: Mack Publishing Company, 1947.

In 1938 the Council of the American Pharmaceutical Association adopted a plan under which the National Formulary would be revised at intervals of five instead of ten years. This plan reflected the rapidity with which changes have occurred in the use of therapeutic agents during the past fifteen years.

The purpose of the National Formulary is to establish official standards of purity, quality, strength and identity of drugs and their preparation. The inclusion of a drug is based not only upon its therapeutic value but also upon the extent of its use. Therefore many drugs are included in the National Formulary which are not included in the Pharmacopoeia. In this edition, which became effective April 1, 1947, 184 articles have been added and 176 articles which appear in N. F. VII have been deleted. The primary title of each drug monograph is in English, while the secondary is a Latinized version of the English title. Weights and measures are given in the metric system, followed by the approximate apothecary equivalent. The emphasis on the metric is to be commended.

The usefulness of the National Formulary is not confined to the above mentioned standards. The present edition continues the practice instituted in N.F. VII of including a chapter on reagents and preparations for use in the clinical laboratory and a chapter on the ingredients of reagents and preparations for use in the clinical laboratory. The last two chapters on general tests, reagents, test solutions, colorimetric solutions, pH, and so forth contain a wealth of information in a form readily available to the medical and pharmaceutical professions.

It would be presumptuous to recommend this book to the medical profession. Its usefulness has been recognized since the first edition, which appeared in 1888.

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**The Pharmacopoeia of the United States of America**, Thirteenth Revision, 957 pages. Price, $8.00. Easton, Pennsylvania: Mack Publishing Company, 1947.

While it is hardly necessary to recommend a new revision of the **Pharmacopoeia** to the medical profession, the advent of a revision may warrant a reconsideration of the advantages of such a book. In a time when new drugs make their appearance at such a rapid rate that it becomes impossible for the physician to evaluate them, the critical and unbiased evaluation represented by their inclusion in this book is reassuring to the physician. Since the standards of quality, purity, and strength set up for drugs included in the **Pharmacopoeia** are enforced by the government under the authority of the Federal Food, Drug, and Cosmetic Act, the physician can prescribe these drugs with complete confidence.

The present revision of the **Pharmacopoeia**, which is the first under the plan for revision at approximately five-year intervals, became official April 1, 1947. Ninety-three articles have been added to U.S.P. XIII, and fifty-six articles which were official in U.S.P. XII have been deleted. Notable among the additions are: desoxycorticosterone acetate, digitoxin, digoxin, diphtheria and tetanus toxoids, protamine zinc insulin, lanatoside C, penicillin, nicotinamide, riboflavin, sulfamerazine, thiamine hydrochloride, testosterone propionate, and vinyl ether. An innovation in this revision is the use of English titles in the leading position determining the alphabetical arrangement of the monographs. Latin titles have been retained also.

**Allergy in Theory and Practice.** By Robert A. Cooke, M.D., Sc.D., F.A.C.P., Attending Physician and Director of the Department of Allergy, the Roosevelt Hospital, New York City. 572 pages, with 43 illustrations. Price, $8.00. Philadelphia and London: W. B. Saunders Company, 1947.

Dr. Cooke and his authoritative contributors have introduced a concise clinical text on allergy which, at the same time, presents the fundamental principles lucidly. The authors are to be commended for integrating theory into logical practice. Particularly in the chapter on allergic dermatitis, unification in theory, at least, has helped to clarify a subject which suffers from confusing terminologies. Aside from the subjects customarily treated in a text on allergy, the inclusion of others such as cardiovascular allergy and allergy of the nervous system presages the increasing domain of this specialty.

This book is highly recommended as an introduction to clinical allergy.

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**The Second Forty Years.** By Edward J. Stieglitz, M.D., F.A.C.P. Foreword by Anton J. Carlson, M.D., Ph.D. 317 pages. Price, $2.95. Philadelphia and New York: J. B. Lippincott Company, 1946.

The excellence of this book is attested by the endorsement of the American Association for the Advancement of Science. The author, editor of **Geriatric Medicine**, is one of the country's leading gerontologists and is preeminently qualified to write an authoritative work on geriatrics for the lay reader. His book is a refreshing change from the pseudoscientific writings so common today.

It is pointed out early in the discussion that the goal of the gerontologist (and of this book) is not to add years to the life but to add life to the years. The importance of the problem of aging is emphasized by showing graphically that in 1900 less than 18 per cent of our poulation was over 45, while conservative estimates indicate that by 1980 this figure will have risen to 40 per cent or above.

The author begins his discussion by describing the aging process and its results. He then takes up the common problems of senescence—"the handicapped heart," hypertension, nutrition, sex, and malignancies. Each one is explained in the light of modern scientific knowledge. The fact that the basis for a large percentage of these problems is laid many years before they appear is constantly emphasized. Prophylactic measures are also stressed, so that a person of any age can obtain benefit from this book.

Bodily well-being is only a part of the subject matter of the book. The author wisely treats, in detail, the philosophy and mental outlook of the aging and aged person.

About the only valid criticism which might be directed at the book is that the author often uses without explanation terms which are not familiar to lay readers.

This book should be of interest to all who are growing older, regardless of their age, and is highly recommended to physicians who treat patients over 40. It has excellent potentialities as an aid in the treatment of the more intelligent patients in "the second forty years."

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**Physicians Handbook.** By John Warkentin, Ph.D., M.D., and Jack D. Lange, M.S., M.D., Ed. 4. 282 pages. Price, $1.50. Chicago: University Medical Publishers, 1947.

This pocket-sized compendium of clinical laboratory methods, clinical procedures, and facts has, since its first edition, been the constant companion of laboratory technicians, medical students, house officers and clinicians. It contains the essential factual data necessary not only for the collection, but also for the interpretation of laboratory and clinical findings in all the various branches of medicine. It is written in outline form, and contains many tables, diagrams, and graphs, giving a maximum of information in a minimum of space.

Because of its convenience of arrangement and size, this inexpensive handbook is almost indispensable for anyone in the medical profession.

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# BULLETIN BOARD

(CONTINUED FROM PAGE 383)

## THE AMERICAN RED CROSS

Dr. Ernest Lyman Stebbins, director of the school of hygiene and public health and professor of public health administration of Johns Hopkins University, has been appointed chairman of the Advisory Board on Health Services of the American National Red Cross, Chairman Basil O'Connor has announced. Dr. Stebbins succeeds Dr. Lewis H. Weed, head of the division of medical sciences, National Research Council, who will continue to serve on the Advisory Board as a member of the committee on medicine. In recognition of his past services, Mr. O'Connor presented Dr. Weed with a special Red Cross citation upon his retirement.

## VETERANS ADMINISTRATION

Establishment of a central laboratory for pathology in Washington, D. C., in cooperation with the Army Institute of Pathology, has been announced by Veterans Administration. The laboratory will provide a consultation, review and diagnostic service in pathologic tissues for VA's 126 hospitals and other medical facilities. In addition, VA pathologists will cooperate with the Army, civilian medical societies, and others in maintaining a central file of pathologic anatomy and related records for reference, research, training and long-range follow-up programs.

## NEWS NOTES FROM THE OFFICE OF THE SURGEON GENERAL

### Major General Bliss New Surgeon General Brigadier General Armstrong Deputy

Major General Raymond W. Bliss is the new Surgeon General of the Army, succeeding Major General Norman T. Kirk. His four year term began June 1. Brig. General George E. Armstrong assumes the duties of Deputy Surgeon General.

Since January 1, 1946, General Bliss has served as Deputy Surgeon General. General Kirk will retire from active duty.

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### Aviation Medicine Course Announced

The recall of twenty Medical Corps Reserve Officers annually for a period of ninety days, for the purpose of attending a course of instruction and training in aviation medicine was recently announced by the War Department.

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**The Borden Company** celebrated its ninetieth anniversary during the month of May, company officials have announced.

In the ninety years of its history, Borden's has branched into many fields. Today the company sells a complete line of dairy products, malted milk, mince meat, chocolate syrup, an instant coffee, casein and urea resin adhesives, soy bean products, pharmaceuticals, animal and poultry feed supplements, and many other products.

# NORTH CAROLINA MEDICAL JOURNAL

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## CARCINOMA OF THE COLON

R. L. SANDERS, M.D.

MEMPHIS, TENNESSEE

Carcinoma of the colon differs from cancer in other areas of the body in one significant respect: It offers a better prognosis. As in most malignancies, the prognosis depends primarily upon the stage at which the disease is discovered. It is often difficult to make an early diagnosis, since the symptoms and signs are by no means peculiar to carcinoma of the colon. They may, in fact, be far more suggestive of some other disease. In such cases, the fate of the patient may depend upon the clinician's "cancer consciousness." As a rule, however, the diagnosis may be readily suspected if one bears in mind that the right and left halves of the colon differ in anatomy and function, and that carcinoma presents certain definite and different clinical manifestations in the two halves.

The right colon is large and movable; its walls are thin and permeable, its contents are liquid, and its function is digestion and absorption. Carcinomas in this half, especially below the hepatic flexure, are usually large, bulky, ulcerative growths of the medullary or mucoid type, with irregular, extensive surfaces. Because of the large lumen, the liquid contents, and the tendency of the malignant growth to perforate and form an abscess, obstruction is seldom pronounced.

The left colon is smaller than the right; it is more tubular and muscular, and, with the exception of the sigmoid, is immovable. The function of the left colon is storage, and its contents are soft or solid. Malignant growths on this side are of a scirrhous or fibrous character, encircling the bowel and producing obstruction early in their course. The majority are located in the sigmoid flexure.

Growths in the transverse colon may be either proliferative or constrictive in type. Those near the hepatic flexure are more often proliferative, whereas those near the splenic flexure are usually constrictive.

### *Diagnosis*

*Carcinoma of the right colon*

On the whole, carcinoma of the right colon manifests itself later and presents more diagnostic difficulty than cancer of the left half. The outstanding symptoms produced by lesions on the right are: anemia, with loss of appetite, weight and strength; digestive disturbance or a sense of discomfort in the abdomen; and a palpable mass in the right side or middle of the abdomen. In addition, the rapid absorption from extensive ulcerating growths in this location usually gives rise to toxic symptoms, such as fatigue, nervousness, insomnia, and headache. Pain and melena usually indicate a late stage of carcinoma in the right colon.

Anemia has been observed in almost two thirds of our patients with carcinoma of the right colon. Weakness and loss of appetite were associated in approximately 50 per cent of these. Not infrequently, the sole clue to the diagnosis was the patient's complaint of profound weakness, suggesting the anemia. In many cases the resemblance to pernicious anemia was striking; in fact, the distinction was not always clear until the roentgenogram revealed the malignancy.

Digestive symptoms—excessive gas, nausea and vomiting, and diarrhea, frequently

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Read before Forsyth County Medical Society, Winston-Salem, January 14, 1947.

alternating with constipation—have been reported by more than half of our patients with carcinoma of the right colon. Blood was found in the stools of half the patients. Practically the entire group complained of discomfort, soreness, or some degree of pain in the epigastrium or right side of the abdomen. Pain, especially if severe and intermittent, was almost universally associated with definite obstructive symptoms, such as gaseous distention, borborygmus, and visible peristalsis. In carcinoma of the right colon, these symptoms most often point to obstruction at the ileocecal valve or the hepatic flexure, and occasionally to volvulus or intussusception incident to the tumor.

The main diagnostic difficulty offered by many carcinomas of the right colon characterized by digestive disturbances and pain is their distinction from gallbladder disease, appendicitis, duodenal ulcer, and amebiasis. This distinction is particularly difficult if the symptoms are not clearly defined. In view of the prevalence of the latter diseases, it is but natural that the clinician should think of them first. He should also think of carcinoma, however, in every patient who presents a digestive complaint, and should not consider the examination complete until the possibility has been excluded or confirmed by roentgenographic studies. The more vague the symptoms referable to the right colon, the more suspicious should one be of carcinoma.

A palpable mass has been observed in more than half of our patients with carcinoma of the right colon. Several of the patients had discovered the mass themselves and had come for examination solely on this account. In such cases also, a roentgenogram is imperative to exclude the possibility of other types of lesions and to confirm the presence of a carcinoma.

### *Carcinoma of the transverse colon*

The symptoms and signs of carcinomas of the transverse colon depend upon their type and location—whether they are proliferative or constrictive, and whether they are in the right or left half of the segment. In the right half they are more likely to exhibit the characteristics of right-colon malignancy; beyond the middle, they generally present those of left-colon lesions.

### *Carcinoma of the left colon*

The outstanding feature of carcinoma of the left colon is obstruction. As a rule, this manifests itself insidiously, as an alteration of bowel function—either constipation or diarrhea, or both alternately. More often than not, blood and mucus appear in the stool sooner or later. Loss of appetite, nausea, and vomiting are not uncommon. Pain is experienced earlier than with lesions of the right colon; it may be dull and aching, though generally it is intermittent and cramp-like. A palpable, tender, firm mass may be elicited, especially if the growth is in the transverse segment or sigmoid. Visible or palpable peristalsis and a rumbling, gurgling or tympanitic sound, with abdominal distention relieved by the passage of gas, complete the picture. Not infrequently, the location of the growth may be indicated by the fact that borborygmus and peristalsis cease at that point. Urinary infection incident to pressure of the tumor upon the urethra may produce urinary frequency, rigors, and fever. A sense of weight in the lower abdomen and pain in the back and down the legs are other symptoms which are often associated. Anemia, weight loss, and cachexia are usually late manifestations of carcinoma of the left colon.

In our experience, pain was the most common symptom of carcinoma of the left colon, being present in more than three fourths of the cases. In almost three fourths of this number the pain was severe. Two thirds of the patients reported constipation. Distention was present in more than half the cases, and bloody stools in almost half. Approximately a fourth of the patients had diarrhea, nausea and vomiting, and borborygmus. It is noteworthy that a third of the patients were anemic.

### *Carcinoma of the rectum*

The diagnosis of carcinoma of the rectum should be relatively easy. The outstanding features are constipation, a sense of fullness and pressure within the rectum, frequently pain and tenesmus on defecation, and the passage of bright blood and mucus. Other prominent symptoms and signs are abdominal distention, pain, a mild diarrhea, anemia, weight loss, and weakness. In these cases also, urinary disturbances incident to pressure upon the urethra may be described. As a rule, a mass can be felt in the rectum on digital examination, and can be seen through the proctoscope. Almost 90 per cent of our patients with rectal carcinoma had observed blood in the stools, and more than 50 per cent complained of constipation, rectal discomfort, and rectal or abdominal pain of greater or less degree. The growth was palpable in 83 per cent of the cases, and in the remainder was apparent on proctoscopic examination.

Digital examination and proctoscopy should be an integral part of the study of any patient who presents symptoms referable to the lower colon and rectum. Proctoscopy is useful not only for visualizing lesions beyond the palpating finger, but likewise for taking specimens for microscopic study. Biopsy should be made whenever an ulcerating or bleeding rectal mass is found. Too often a malignant growth in the rectum is mistaken for some other disease, usually hemorrhoids. Eleven per cent of our patients with carcinoma of the rectum had been treated for bleeding hemorrhoids.

### *The importance of x-ray examination*

Not infrequently, the diagnosis of carcinoma of the colon may be made from the history alone, and one should always be able to elicit one or more symptoms to suggest its presence. We have had a few cases in which the history provided the sole clue to the diagnosis, the entire examination being negative. As a rule, however, the diagnosis hinges upon the roentgenogram. Every patient who presents a single symptom of carcinoma which has persisted over a period of several weeks should have a complete roentgenographic study of the gastro-intestinal tract, unless the cause is found on digital and proctoscopic examination. The gastrointestinal series should include studies following the introduction of barium not only by mouth, but by enema; fluoroscopic examination should be employed during injection of the barium to reveal any lesions which might be obscured by overlapping areas of the colon.

## *Surgical Treatment*

The notable improvement in the morbidity and mortality associated with surgery of the colon within recent years may be attributed in large part to improved methods of preoperative and postoperative care. We have come to realize the advantages of preparing these patients so that they have every opportunity of coming through the surgical procedure safely and, with the help of the new postoperative measures, of going on to recovery. Such patients are usually in a poor nutritional state as a result of their inability to take food; they are dehydrated, anemic and toxemic, and their blood chemistry values are materially altered. Fortunately, even the most desperately ill may now be prepared so that operation may be performed with reasonable safety. Modern preoperative treatment consists in the administration of fluids intravenously; blood transfusions; a high-calorie, high-vitamin, and low-residue diet; the use of amino acids, blood plasma and serum globulin to restore protein deficiencies; and sulfonamide therapy to minimize the danger of infection.

### *Carcinoma of the right colon*

For carcinoma of the right colon, we consider the one-stage operation with ileotransverse-colostomy the best procedure. Unless obstruction is severe, it is unnecessary to use the Miller-Abbott tube or make a vent to the surface to overcome distention. In more advanced obstructions, the use of the tube for a few days prior to operation will often decompress the bowel sufficiently to permit the performance of a right colectomy in one stage.

The choice of the type of anastomosis in right colectomy is largely a matter of individual preference. Formerly, we employed the end-to-side technique (end of the ileum to the side of the transverse colon), but in more recent years have preferred the side-to-side anastomosis using an open method. The wound is usually closed without drainage, and satisfactory bowel function is quickly established. Experience has proved that there is little danger of peritonitis and wound infection.

Until a few years ago, surgeons everywhere emphasized the importance of complete and thorough peritonization of the gutter after removal of the right colon. The majority have now abandoned this painstaking part of the operation, no longer making an effort to cover the raw space left by the resection. Our own results have been equally as good without peritonization as with it.

In the literature, frequent references are made to the use of the Mikulicz operation for right colectomy. We have never felt justified in subjecting patients to multiple operations when a one-stage procedure can be performed so safely. With the latter, the patient is well and out of the hospital within two or three weeks, whereas with the Mikulicz technique the total hospitalization covers a period of several weeks. Thus, not only does the Mikulicz procedure necessitate repeated surgical risks and an unnecessarily prolonged period of disability, but it also imposes a greater financial burden on the patient. If one could prove the two-stage operation to be safer, the elements of time and expense might be disregarded; but our experience has not shown that it affords any greater measure of safety.

### *Carcinoma of the transverse colon*

For carcinoma of the transverse colon, we prefer a one-stage resection with end-to-end anastomosis. The majority of our patients with carcinoma in this segment have had only a mild degree of obstruction and have not required a preliminary decompression operation. The Mikulicz operation is satisfactory for growths of the transverse colon, but again has the disadvantage of involving multiple stages, with their attendant risks and prolonged period of hospitalization.

### *Carcinoma of the left colon*

For lesions of the splenic flexure and left colon we formerly employed the Mikulicz principle almost exclusively; during the past several years, however, we have performed primary resection routinely. A large wedge of the gland-bearing mesocolon may be removed with equal ease by either method. In several cases we have employed primary resection, with end-to-end anastomosis, for lesions low in the sigmoid.

If the obstruction is of mild degree, we do not make a vent to the surface. In our early experience with primary resection and end-to-end anastomosis, a temporary tube colostomy was done, with the idea of avoiding postoperative distention and leakage at the suture line. This practice was discontinued some time ago, and, thus far, we have not observed evidence of leakage in a single case. If the obstruction is severe, however, a preliminary transverse colostomy is made and the distal segment is irrigated for two or three weeks before the resection is done; the colostomy is closed later. If the colon is mobilized so as to permit closure without tension, if the different layers of the colon walls are sutured properly, with adequate closure of the mesocolon and complete coverage of raw space, and if sulfonamide drugs are given prophylactically, obstruction and infection are remote possibilities. The ultimate success or failure of the operation obviously depends upon whether all the malignant tissue, including the glands, is removed.

### *Carcinoma of the rectum*

During the past several years we have performed an abdominoperineal resection for almost all carcinomas of the rectum, and for a number of cancers at the recto-sigmoid juncture. In all except our earlier cases, the operation has been completed in one stage.

We are of the opinion that the first consideration in the treatment of carcinoma of the rectum and rectosigmoid is to cure the patient. This being true, one should not permit sentiment to deter him from doing a thorough resection, and removing the anus. We have performed a number of anterior resections for lesions in the rectosigmoid or upper rectum, leaving the anus. This procedure, however, has been limited to cases in which there was extension to neighboring structures and possible metastases in the liver. It is a palliative measure, designed only to remove the growth, overcome obstruction, and make the patient more comfortable.

One feature of the surgical technique which we unfailingly observe concerns the closure of colostomy wounds. We have found that delayed closure—that is, packing the wound with antiseptic gauze, allowing the sutures to remain untied, and, forty-eight hours later, removing the gauze and tying the sutures tight—is the best protection against wound infection. Primary healing takes place in practically every case.

### *The importance of exploration and radical extirpation*

Our experience with colon surgery has taught us that the abdomen should always be explored throughout at the time of laparotomy. Occasionally, one will be surprised to find multiple malignancies, either in the colon alone or associated with growths elsewhere. We have had this experience in several of our cases.

With all the refinements of preoperative and postoperative care, we have grown more and more bold in our surgical attack upon carcinoma of the colon. We are now doing resections even in the presence of a moderate amount of liver metastases, having found that occasionally a life is thereby prolonged a surprising length of time, and that the patient's remaining existence is at least made more tolerable by extirpation of the original growth.

We do not hesitate to do a resection when the lesion has invaded an adjacent viscus, provided the risk is not too great. If one follows the rule of doing as radical an extirpation as is possible, he may sometimes add years to a patient's life.

### *Types of Operations and Distribution of the Lesions*

In our experience, more than three fourths of all diseases of the colon requiring operation have been carcinomas. This statement does not include patients who had merely an exploration nor those whose condition was regarded as hopeless without exploration. We have explored or operated upon a total of 233 patients. Of these, 32 had an exploration, 28 had a palliative operation, 4 had a local excision of a malignant polyp, and 170 had a resection. One patient had two resections at an interval of ten years, making a total of 234 operations. The distribution of the lesions is shown in table 1.

**Table 1**

**Distribution of Carcinomas of the Colon in 234 Cases**

| *Location* | *No.* | *Per Cent* |
|---|---|---|
| Right colon | 37 | 15.7 |
| Transverse colon | 19 | 8.5 |
| Left colon | 101 | 43.2 |
| Rectum | 77 | 32.7 |

### *Results of Operation*

Since, for purposes of this discussion, we are interested only in resections, we have analyzed the operative and ultimate results in those cases in which this procedure was employed. In order to evaluate better the newer methods of preoperative and postoperative treatment, as well as the newer surgical techniques, we have divided the cases into two groups: (I) those in which resection was performed before 1939, and (II) those operated on after that date. The number of resections and the operative mortality are shown in table 2.

**Table 2**

**Resections of the Colon and Rectum for Carcinomas in 234 Cases (233 Patients)**

| *Group* | *Cases* | *Resections* | | *Operative Deaths* | |
|---|---|---|---|---|---|
| | | *No.* | *Per Cent* | *No.* | *Per Cent* |
| I (Prior to 1939) | 59 | 35 | 58 | 10 | 28 |
| II (1939-1947) | 175 | 135 | 77 | 5 | 3.7 |
| **Total** | **234** | **170** | **72.6** | **15** | **9** |

It will be observed that, in our experience, the mortality associated with resections for carcinomas of the colon has decreased approximately 24 per cent since 1939. Furthermore, better preparation of patients and the use of better methods of anesthesia enabled us to perform resections in a large number of poor-risk patients. Another factor responsible for the higher percentage of resections in group II is the extension of our criteria for resection.

#### *Operative mortality*

Of the 5 postoperative deaths in group II, 4 followed abdominoperineal resection for rectal carcinoma, giving a mortality rate of 8.3 per cent in the 48 cases of rectal carcinomas in this group. One of these patients, a man aged 68 years, should not have had an operation, as he was a diabetic and suffered from cardiovascular disease. He apparently died of either a cerebral embolus or an acute heart attack. One, a 45-year-old woman, died on the table without any apparent cause. The third, a woman aged 60, died of acute urinary retention; and the fourth, a man of 74, died of peritonitis following acute distention and perforation of the sigmoid.

The one remaining death in group II followed a two-stage resection of the sigmoid with end-to-end anastomosis, and was due to uremia. The patient was a man 75 years of age. This one death constitutes an operative mortality of 2 per cent for resections of the left colon and 0.87 per cent for all resections of the colon, exclusive of the rectum, since 1939 (table 3).

**Table 3**

**Mortality of Resections for Carcinomas of the Colon and Rectum**

| *Group* | *Rectum* | *Deaths* | | *Colon* | *Deaths* | |
|---|---|---|---|---|---|---|
| | | *No.* | *Per Cent* | | *No.* | *Per Cent* |
| I (Prior to 1939) | 10 | 1 | 10 | 25 | 9 | 36 |
| II (1939-1947) | 48 | 4 | 8.3 | 87 | 1 | 0.87 |
| **Total** | **58** | **5** | **8.6** | **112** | **10** | **9** |

We have had no fatalities from colon resections in more than six years, since we began to employ one-stage resections of the transverse and left colon.

*Survival rate*

Of 60 patients who had a resection for carcinoma of the colon or rectum more than five years ago, 1 is living twenty-four years later, 5 are living fifteen or more years later, 4 have survived ten years or longer, and 13 have survived five years or more. These 23 patients represent 38.3 per cent of the 60 on whom resection was performed. During this same period 33 patients had either a palliative operation or merely an exploration. On the same percentage basis, 12 of these patients would have lived five years or more had they come to operation before their condition had become hopeless. This figure does not take into consideration those who did not even have an exploration.

Our percentage of ten-year survivals is considerably higher than our five-year survival rate. This fact would indicate that our efforts to bring these patients to operation while their disease is still curable have been of little avail. On the other hand, the fact that 38.3 per cent of the patients in this group who had the benefit of resection have survived from five to twenty-four years illustrates the favorable prognosis that may be offered the unfortunate victims of carcinoma of the colon when the lesion is recognized and removed before the malignant cells have spread beyond the reach of the scalpel.

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**The training of the doctor**, which began with observations on and the care of the sick individual, is due now for a great forward stride. Observations on whole communities, whether great or small (or on appropriate samples) and improved health provisions for them, must henceforward become the prior objective. The individual is not likely to suffer neglect in the process, for all communities are composed of individuals. For generations yet we shall doubtless continue to build our costly hospitals and clinics, and require our armies of practitioners and ancillaries, but meanwhile we must at least embark upon the crusade which will end in the steady reduction of waiting-lists and the closure of hospital wards, and which will eventually put the physical, mental and moral health of peoples before their material wealth. In that crusade—whether by our researches, by realistic reforms in teaching, by the better education of the people or direct representations to government—it is our first duty as physicians to explore and prepare the way.—John A. Ryle: Social Pathology and the New Era in Medicine, Bull. New York Acad. Med. 23:329 (June) 1947.

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# STREPTOMYCIN IN TULAREMIC PNEUMONIA

## *With Two Case Reports*

ARTHUR J. DRAPER, M.D.
CHARLOTTE

Although there have been many recent reports emphasizing the remarkable efficacy of streptomycin therapy in tularemic infections(1), we feel that presentation of the following cases is justified in order to stress the importance of early diagnosis of the pleuropulmonary form and to point out a relatively frequent complication, pleural effusion.

### *Case Reports*

*Case 1*

A 40-year-old white male salesman was admitted to the Charlotte Memorial Hospital on January 2, 1947, complaining of severe weakness and malaise of five days' duration. Early one morning, as he was hunting, he felt overpowering weakness and malaise. Next day his temperature rose to 102 F., and thereafter varied between 102 and 103 F. until admission. Headache developed two days before admission, and he was "out of his head off and on" thenceforth. Nausea with occasional vomiting had been present three days. There were no symptoms referable to the chest except a slight, nonproductive cough. The patient had been hunting rabbits daily for at least two weeks before the onset of his illness, and skinning each day's bag barehanded.

Physical examination upon admission revealed an acutely ill, restless white male. The temperature was 100 F., pulse 120, respiration 24. The blood pressure was 114 systolic, 70 diastolic. Except for occasional sibilant rales over the lung bases and tenderness to deep palpation beneath the right costal margin, there were no significant findings.

Admission laboratory data were as follows: red blood cells, 4,360,000; hemoglobin, 13 Gm. (90 per cent); white blood cells, 6,550, with 89 per cent neutrophils, 10 per cent lymphocytes, and 1 per cent eosinophils. Urinalysis was normal except for a trace of albumin. A roentgenogram of the chest made on the second hospital day showed pneumonia in the left infraclavicular area and in the lateral aspect of the right chest.

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1. (a) Heilman, F. R.: Streptomycin in Treatment of Experimental Tularemia, Proc. Staff Meet., Mayo Clin. 19:553-559 (Nov. 29) 1944.
   (b) Foshay, L., and Pasternack, A. B.: Streptomycin Treatment of Tularemia, J.A.M.A. 130:393-398 (Feb. 16) 1946.
   (c) Gordon, A. M.: Streptomycin in Tularemia, J.A.M.A. 132:21-22 (Sept. 7) 1946.
   (d) Howe, C., Correll, L. L., Borkwalter, H. L., and Ellington, H. V.: Streptomycin in Tularemia, J.A.M.A. 132:195-200 (Sept. 28) 1946.
   (e) Foshay, L.: A Comparative Study of the Treatment of Tularemia with Immune Serum, Hyperimmune Serum, and Streptomycin, Am. J. Med. 1:180-188 (Aug.) 1946.
   (f) Hartnett, W. G., and Mollica, S. G.: Tularemia: Treatment of a Case with Streptomycin, South. M. J. 39:774-777 (Oct.) 1946.
   (g) Nichols, D. R., and Herrell, W. E.: Streptomycin: Its Clinical Uses and Limitations, J.A.M.A. 132:200-206 (Sept. 28) 1946.
   (h) National Research Council, Chester S. Keefer, M.D., Chairman: Streptomycin in Infections, J.A.M.A. 132:70-77 (Sept. 14) 1946.
   (i) Hunt, J. S.: Pleuropulmonary Tularemia, Ann. Int. Med. 26:263-276 (Feb.) 1947.

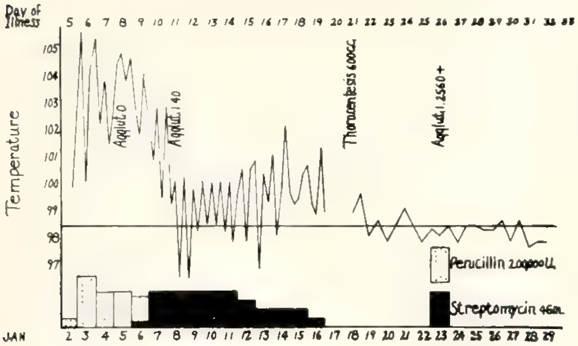

**Fig. 1. Note prompt response of the temperature curve to streptomycin, yet failure to reach normal levels until after thoracentesis. The temperature was not charted on January 17.**

The patient's course during the next four days was alarming. On the second hospital day he had a shaking chill followed by a rise of temperature to 105.8 F. (fig. 1). He was irrational and delirious most of the time. The cough became more harassing, and drenching sweats were frequent. Nausea and vomiting occurred once or twice daily. Though the presumptive diagnosis upon admission was atypical pneumonia, penicillin was administered as a precautionary measure. As a glance at figure 1 shows, it had no beneficial effect.

Streptomycin was started on the fifth hospital day in doses of 0.5 Gm. (500,000 units) intramuscularly every three hours. Within twenty-four hours the patient was no longer irrational, and his fever had begun to fluctuate at lower levels. During the next nine days, he held his clinical gains and noted an increase in appetite, while his temperature, still swinging in type, remained at much lower levels. He continued to cough, however, without raising significant amounts of sputum, and to complain of an almost constant aching pain in the right lower chest anteriorly, accentuated by coughing. On the sixteenth hospital day a friction rub was heard over the right base posteriorly and in the axilla. Next day flatness to percussion, absence of tactile fremitus and breath sounds, and egophony at the seventh right interspace posteriorly denoted pleural effusion. Thoracentesis produced 600 cc. of serosanguineous, almost coffee-colored fluid with a specific gravity of 1.016 which, on smear, showed numerous red blood cells and white blood cells. Thereafter, the patient rapidly improved. His temperature remained normal, he complained of no chest pain or cough, and he began to regain weight and strength. Discharged on the twenty-eighth hospital day as much improved, he continued to do well; six weeks after dismissal he had reached normal weight, after having lost 25 pounds at the peak of his illness.

Changes in the agglutination level were pronounced (fig. 1). Agglutination tests with Pasteurella tularense were negative at first, but the titer rose to 1:40 on the third day of streptomycin therapy and to 1:2560+ fifteen days later, after 30.5 Gm. of streptomycin had been given over an eleven-day period. X-rays showed progression in the pneumonic process from admission to the thirteenth hospital day (fig. 2), but had markedly improved two days before discharge (fig. 3).

## *Comment*

The diagnosis in this case was by no means obvious. Symptoms of severe intoxication — high, relatively sustained fever, drenching sweats, delirium, nausea, and weakness—were much more prominent than local symptoms of cough and chest pain. Physical examination, too, yielded meager information. The history of contact with rabbits in a gravely ill patient with roentgeno-

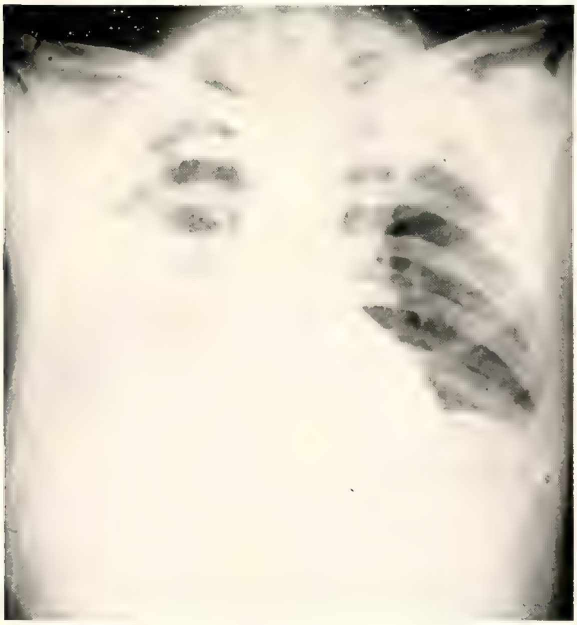

**Fig. 2. Chest film taken on seventeenth day of illness, showing maximal spread of pneumonia.**

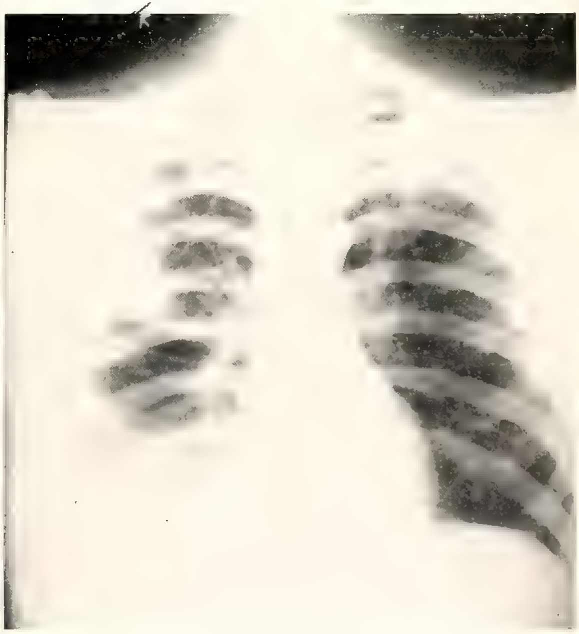

**Fig. 3. Chest film taken on thirtieth day of illness, showing pronounced clearing of right lung and left apex, though the diaphragm is still elevated at the site of fluid removal.**

graphic evidence of atypical pneumonia led to the use of streptomycin. Clinical improvement was rapid and dramatic; in our opinion, the patient owes his life to the drug. Complete recovery, however, did not ensue. The persistence of dry cough, chest pain, and low-grade fever was doubtless due to a pleural reaction which eventually resulted in the formation of pleural fluid, serosanguineous in type. When this was withdrawn, recovery was unimpeded.

A high agglutination titer quickly developed, rising from zero to 1:2560+ in two and a half weeks. Although roentgenograms showed a spread of pulmonary infiltration from January 3 to January 14 (two days before streptomycin was discontinued), resolution of the process was rapid thereafter, as the film of January 27 shows. The amount of streptomycin used was greater than that said to be necessary to control tularemia, but we felt that the desperate condition of the patient warranted maximal dosage.

*Case 2*

A 10-year-old farm boy was admitted to Good Samaritan Hospital on June 25, 1947, in a state of mental confusion, disorientation, and drowsiness. Five days before, he had noticed general malaise, followed next day by shaking chills, nausea, vomiting, and drowsiness. Vomiting continued through the next day. High fever was noted on the second day and persisted until admission. Throughout the illness, high fever, drowsiness, and mental confusion were the most outstanding symptoms. There were no complaints referable to the chest. Five days before the onset of his illness, the patient caught and played with a young wild rabbit.

Outstanding findings on physical examination were a temperature of 104 F., with a pulse rate of only 100. Except for pronounced drowsiness and dryness of the skin, there were no other remarkable findings.

Emergency laboratory studies showed a red cell count of 4,660,000, a hemoglobin of 82 per cent, and a white cell count of 10,100.

A presumptive diagnosis of typhoidal tularemia was made, and streptomycin therapy (3 Gm. every twenty-four hours in divided doses) was instituted. On the second day (fig. 4) there was a sharp drop in temperature, but confusion, disorientation, and hallucinations persisted. Despite the absence of chest signs, an x-ray made on the fourth hospital day showed pneumonia extending from the right hilum (fig. 5). By the fifth hospital day, all mental symptoms had disappeared, and the patient began eating well. On the sixth hospital day the temperature rose to 101.8 F., and the dosage of streptomycin, which had been dropped to 1 Gm. a day, was raised to 1½ Gm. a day. Next day the temperature spiked to 103.5 F. Since there were no further physical signs to be observed, a presumptive diagnosis of drug fever was made and streptomycin was discontinued, a total of 13½ Gm. having been administered. Thereafter, the patient's course was entirely normal, and he was discharged as cured on the fifteenth hospital day.

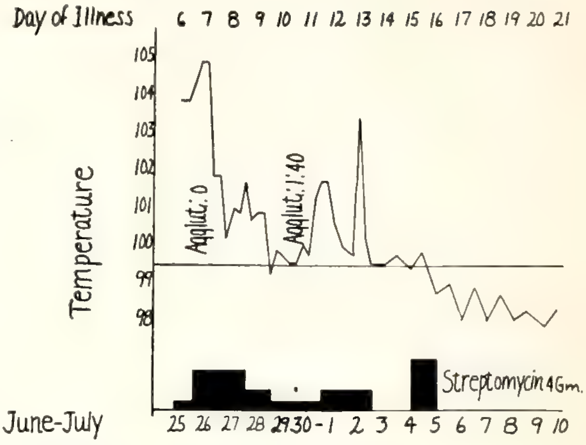

**Fig. 4. Note the prompt response to streptomycin initially, followed by a febrile reaction on the two days before the drug was discontinued. All temperatures were taken rectally.**

The rapid resolution of pneumonia, which reached its greatest extent on the seventh hospital day (fig. 6), is seen by the final film taken on the fourteenth hospital day (fig. 7). On the seventh hospital day, physical signs of consolidation were pronounced on the right posteriorly from the fifth interspace downward. These signs had begun to disappear by the ninth day, and at discharge the chest was clear to percussion and auscultation. Agglutination tests with Pasteurella tularense, negative on the second hospital day, had become positive in a dilution of 1:40 by the sixth hospital day. A third agglutination test was made on the fourteenth hospital day, but has not as yet been reported.

## *Discussion*

### *Diagnosis*

Except in the typhoidal type, which comprises about 6.4 per cent of all cases(2), the diagnosis of tularemia is seldom difficult. A history of exposure to rabbits, or, less commonly, to squirrels, opossums, weasels, or ticks(3) arouses strong suspicion. Within a few hours to two weeks after exposure (two to five days on the average(3b)) general symptoms of severe illness develop, often suddenly, including chills, fever, headache, aching, nausea and vomiting, and cough. About forty-eight hours later the primary lesion, skin or conjunctival, and associated lymphadenopathy become apparent(3b). Differentiation into clinical types has been standardized for years; Foshay(3b), in reviewing 600 cases of tularemia, found 87.5 per cent to be of the ulcero-glandular type, 3 per cent of the glandular type, 1.8 per cent of the oculo-glandular type, and 7.7 per cent of the typhoidal type.

This last group, most important for our

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2. Stuart, B. M., and Pullen, R. L.: Tularemic Pneumonia, Am. J. M. Sc. 210:223-236 (Aug.) 1945.
3. (a) Blackford, S. D., and Casey, C. J.: Pleuropulmonary Tularemia, Arch. Int. Med. 67:43-71 (Jan.) 1941.
   (b) Foshay, L.: Tularemia, Medicine 19:1-83 (Feb.) 1940.

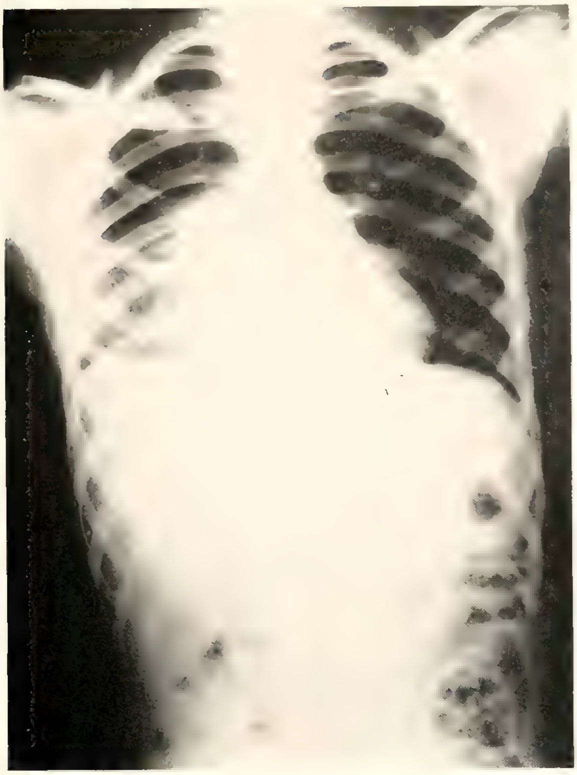

Fig. 5. Chest film taken June 28, showing an early spread of pneumonia from the right hilum.

present consideration, shows no primary lesion and no lymphadenopathy(3b,4). Only the general symptoms listed above, and the additional grave signs of prostration, delirium, stupor, and coma may be observed. The agglutination test, never positive in the first week and sometimes negative in the third or even the fourth week(3b), offers little help in the early stages of the disease. Indeed, laboratory personnel who possessed agglutinins as a result of receiving Foshay serum showed a sharp drop in agglutination titer after acquiring the disease(1d). Pneumonia occurs with far greater frequency in the typhoidal type than in other types(2,3). More than a third (36.2 per cent) of all cases of tularemic pneumonia reported in the American literature(2) were of the typhoidal type. A large number of cases of tularemic pneumonia, therefore, will show no diagnostic features. Roentgenographic signs are those of atypical pneumonia, sometimes with later consolidation of one or more lobes(2,5); Bihss and Berland(5) found that in typhoidal tularemia

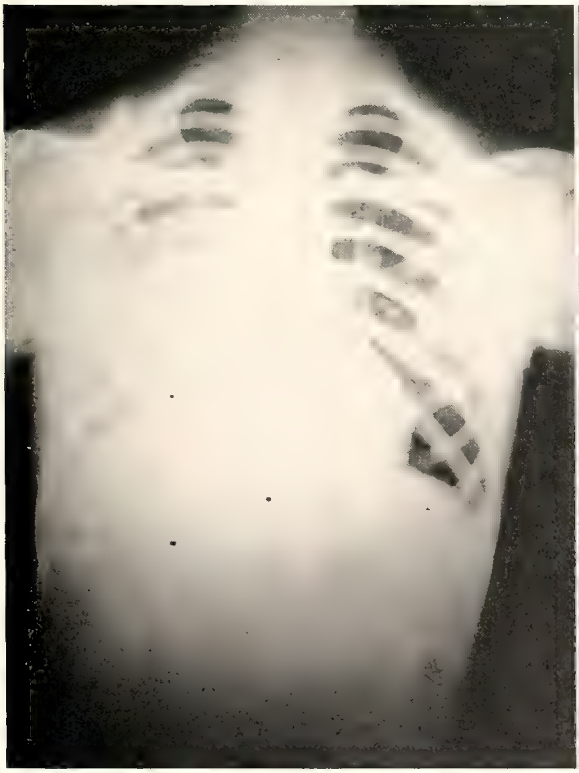

Fig. 6. Chest film taken July 1, showing maximal pneumonic involvement of the right middle and lower lobes.

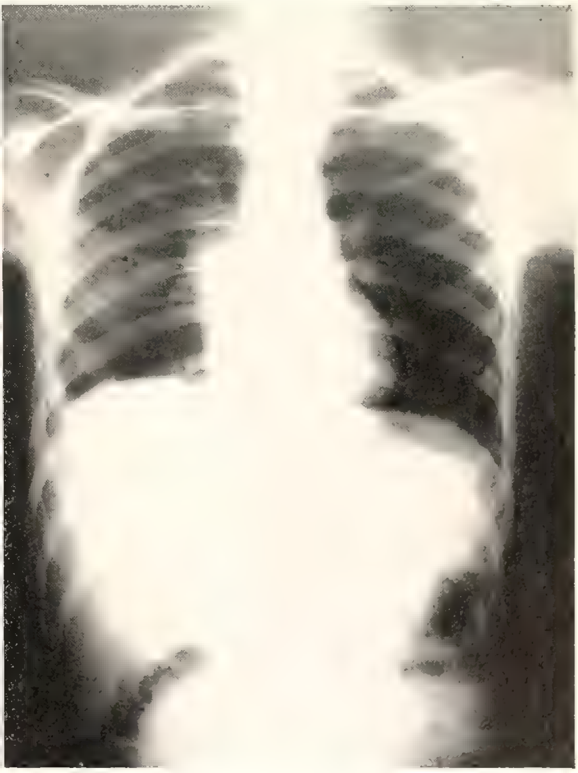

Fig. 7. Final film taken July 8, showing pronounced clearing except for a small area about the right hilum.

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4. Scott, J. W., and Macbeth, R. A. L.: Tularaemia, Canad. M. A. J. 55:564-566 (Dec.) 1946.
5. Bihss, F. E. and Berland, H. I.: Roentgenological Manifestations of Pleuropulmonary Involvement in Tularemia. Radiology 41:431-437 (Nov.) 1943.

hilar lymphadenopathy, striking in other types of the disease, was not an early feature. In the absence, then, of definite diagnostic criteria elicitable by physical examination, x-ray studies, or serologic methods, a trial of streptomycin as advocated by Hunt(1i) should be given each patient with severe atypical pneumonia.

### *Treatment*

The treatment of tularemia has, since the advent of streptomycin, become at the same time simple and highly effective. Stimulated by the report of Heilman concerning the dramatic effect of streptomycin on tularemia in mice(1a), many investigators and clinicians have described similar effects in human cases(1b-i). Of 67 cases reported to the National Research Council(1c), 63 recovered. In two of the failures the diagnosis was questionable and the total dosage of streptomycin grossly inadequate; in these and one other, treatment was begun two months after the onset of symptoms. One patient with pleuropulmonary tularemia died on the first day of treatment; 10 recovered. Subsequently Hunt(1i) has reported dramatic improvement in 11 out of 12 cases of pleuropulmonary tularemia; the one patient who died had cerebral complications. Thus, a disease carrying an overall mortality rate of 6 per cent(3b), and a rate in the pleuropulmonary form of 39.9 per cent(2), has been brought almost entirely under control by the use of streptomycin.

The details of the administration of streptomycin have been related elsewhere(1g-i). It is injected intramuscularly in a concentration of 100-200 mg. per cubic centimeter every three to six hours; the daily dosage usually recommended for tularemia is 1 to 2 Gm. In severe pleuropulmonary cases, or in the typhoidal type when the patient is showing signs of septicemia, larger doses may be given. As a rule administration is discontinued after seven days, but may be prolonged in severe cases.

Although local pain at the site of injection—a discomfort somewhat relieved by mixing procaine into the diluting fluid—is frequent, other toxic effects of streptomycin are not often observed. These include(6): the "histamine-like" reaction, with headache, flushing, and nausea; the "sensitization" type, with fever and a nonspecific skin eruption; and the "neurological" type characterized by vertigo, tinnitus, and deafness. This last manifestation necessitates withdrawal of the drug; sensitization may be reduced by shortening the interval between injections. In the dosage recommended for tularemia, however, severe reactions are unlikely.

It must be emphasized that streptomycin should be started as soon as possible—certainly within the first fifteen days of the disease(1c). Where doubt as to the diagnosis exists, as in pleuropulmonary disease without a demonstrable primary lesion, a therapeutic trial of 2 Gm. daily for two days is strongly recommended(1i).

### *Complications*

Factors delaying recovery include pneumonic lesions and their sequelae, liquefaction necrosis of lymph nodes, and lesions of serous membranes(1e). Our immediate concern is with pleural effusion. Although in 1941 Blackford and Casey(3a) were able to find only 30 cases of hydrothorax in all the literature on tularemia, Stuart and Pullen(2) later reported some pleural reaction in 50 per cent of all cases of tularemic pneumonia. In 3 of Hunt's 12 cases(1i) serosanguineous fluid was aspirated from the pleural cavity. Streptomycin does little to prevent fluid formation. Thoracentesis was necessary in Hunt's cases within four to nineteen days after streptomycin had been started.

The first case in the present report (see figure 1) graphically shows the need of watchfulness for the common complication of hydrothorax. While streptomycin caused rapid improvement in the patient's general condition and temperature curve, complete recovery did not ensue until after thoracentesis.

Resolution of the pulmonary exudate is somewhat accelerated by streptomycin, but x-ray signs may persist long after clinical improvement has become established. Pleural effusion appears to prolong complete healing and should be anticipated.

### *Summary*

1. Two cases of severe pleuropulmonary tularemia of the typhoidal type, successfully treated with streptomycin, are reported.

2. The difficulty of exact diagnosis in the early stages of the disease is emphasized, and

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6. National Research Council, Chester S. Keefer, M.D., Chairman: Streptomycin in Infections, J.A.M.A. 132:4-11 (Sept. 7) 1946.

a therapeutic trial of streptomycin in similar cases of severe atypical pneumonia is strongly urged.

3. The incidence and management of a common complication of tularemic pneumonia tending to delay recovery—pleural effusion—are briefly discussed.

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# AN EVALUATION OF THE USE OF ANTIBIOTICS IN DERMATOLOGIC DISEASES

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So many clinical reports have been published on the use of antibiotics in dermatology that it is difficult to evaluate their true worth. This confusion is to be expected when a new medicament becomes widely available. It is probably true that the sulfonamide series of drugs are not clearly evaluated even today, after some ten years of widespread use; it was only a few months ago that an authoritative article suggested the abandonment of sulfanilamide dusting in wounds. Many new pharmaceutical preparations which have too short a period of laboratory investigation cause an initial burst of enthusiasm in clinical trial, then a period of condemnation and abandonment; many months or years later a proper appraisal of the drug's real worth and place in medical treatment is made. Perhaps such a course of events can be avoided with regard to the antibiotics, but at this early stage it is too soon to be sure, despite the fact that scientists have known something about antibiotics for over fifty years, and have experimented with at least forty-two different kinds.

The most widely used antibiotic, penicillin, has been readily available for something less than three years, and during this period it has been used in many types of skin diseases. Neglect of the fundamental principles of dermatologic treatment—such as the absorption of discharges from oozing lesions, the debridement of all encrusted lesions prior to the application of topical remedies, the use of the proper vehicles which will penetrate or mix with serous discharges, or soften tough and horny crusts—and of the surgical principle of establishment of drainage in lesions which enclose pus, has resulted in conflicting reports which are confusing to all concerned.

It is well to answer, if possible, the following questions before using one of the antibiotics in any dermatologic condition.

1. Is the disease due to a microbial organism, and is that organism susceptible to the antibiotic?

2. If the answer to the first question is in the affirmative, then one should ask: Can the lesion be reached without further measures, such as removal of crusts and debris, or surgical drainage?

3. The third question should be: What vehicle should be used in order to get the medicament to the lesion? Should it be applied as an aqueous compress, given parenterally, or used in a water-soluble, absorptive-base ointment, or possibly in a water suspension?

The above questions automatically go through the dermatologist's mind as he considers the problem before him, and in the evaluation of the antibiotics these principles must be kept in mind. An effort to compare the effectiveness of penicillin, streptomycin, and tyrothricin with other methods of treatment seems the most practical approach to this evaluation, with particular reference to (1) the time needed to effect a cure, (2) the relative efficacy of the treatment when applied by an untrained person (the patient), and (3) the ability of the particular agent to effect a satisfactory outcome in a disease heretofore resistant to other methods of treatment.

### *Penicillin*

With the above criteria in mind, four tables have been prepared to show the results which may be expected with penicillin in various dermatologic conditions. Table 1 lists the dermatoses in which penicillin appears to be superior to other treatments. Of these ten diseases, only one, impetigo contagiosa, responds readily to topically applied penicillin, preferably an ointment consisting of 500 units of penicillin per gram of water-soluble ointment base. Pyogenic dermatitis may respond to penicillin compresses containing 250 units per cubic centimeter of normal saline, but it is advisable to use parenteral penicillin as well, since the disease generally involves the deeper layers of the skin

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Read at a Symposium for Medical Alumni, Duke University, Durham, April 24-26, 1947.

**Table 1(1)**

**Anticipate Excellent Results with Penicillin in**
**Impetigo Contagiosa**
**Cellulitis, Acute**
**Pyogenic Dermatitis**
**Anthrax**
**Vincent's Stomatitis**
**Syphilis, Cutaneous**
**Yaws, Cutaneous**
**Gangrenous Stomatitis (noma)**
**Erysipelas**
**Erysipeloid (swine bacillus)**

also. In all the other conditions listed, penicillin should be given intramuscularly in doses of not less than 25,000 units of the aqueous solution every three hours for five to seven days, or 300,000 units of the peanut oil-beeswax emulsion daily for five to seven days. Occasionally a longer period of treatment will be necessary, depending upon various local factors, and in the case of cutaneous syphilis a much higher total dose given over a proportionately longer time will be required.

**Table 2(1a,b,2)**

**Anticipate Good Results with Penicillin in**
**Ecthyma (ulcerative impetigo)**
**Impetigo Neonatorum**
**Carbunculosis**
**Cellulitis, Chronic**
**Actinomycosis**
**Tropical Ulcer (phagedenic)**
**Hidroadenitis Suppurativa**
  **(chronic axillary adenitis)**
**Infectious Eczematoid Dermatitis**
**Nodular Non-Suppurative Panniculitis**
  **(Weber-Christian disease)**
**Bullous Orificial Erythema Multiforme**
  **(Stevens-Johnson disease)**

Table 2 lists ten conditions which respond as well to penicillin as to any other known means, and the choice of therapy may rest upon factors of economy, ease of application in the home, or any other reasonable basis. For some of the diseases listed in this category penicillin may eventually be the treatment of choice. Inasmuch as very few patients with Weber-Christian or Stevens-Johnson disease are seen, the reports are not yet fully confirmed, and it is considered advisable to place these conditions in the "good result" rather than in the "excellent result" group.

**Table 3(1a,3)**

**Anticipate Fair Results with Penicillin in**
**Furunculosis**
**Sycosis Vulgaris (barber's itch)**
**Pemphigus Vulgaris (?)**
**Lupus Erythematosus, Chronic Discoid (?)**

Table 3 concerns five diseases in which penicillin is of doubtful value. Furunculosis responds temporarily in most instances, but a few cases apparently are influenced favorably and do not recur. Note the inclusion of pemphigus vulgaris in this table. It is one of the diseases generally regarded as not responsive to penicillin, but in 2 reported cases—one from Duke Hospital—pemphigus has been relieved temporarily, at least, by penicillin. In this almost universally fatal disease, any aid is well worth mentioning.

**Table 4(1a)**

**Penicillin Has Not Proved of Value in**
**Acne Vulgaris**
**Ulcer, Hemostatic**
**Ulcer, Decubitus**
**Dermatitis, Hemostatic**
**Dermatitis Repens**
**Lupus Erythematosus, Acute Disseminate**
**Coccidioidomycosis, Cutaneous, Late**
**Lymphopathia Venereum**
**Chancroid**
**Granuloma Inguinale**
**Tuberculosis, Cutaneous**
**Leishmaniasis Americana**
**Blastomycosis, Cutaneous**
**Dermatitis Herpetiformis**
**Moniliasis (thrush)**

Table 4 is a list of fourteen dermatoses in which penicillin is of no value, or in which another remedy is far superior.

### *Streptomycin*

Experience with streptomycin has been limited because of the small supply. Only five conditions are listed in table 5 as being responsive to penicillin, and in none of these has a sufficient number of cases been observed over a long enough period to prove unequivocally streptomycin's value. Time and an increasing supply of the drug will tell us much in the future. Results in cutaneous tuberculosis have been good in some cases, but relapses in scrofuloderma have been observed several times. The antibiotic must be given parenterally in doses of 1 to

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1. (a) Pillsbury, D. M.: The Management of Bacterial Infections of the Skin, J.A.M.A. 132:692-698 (Nov. 23) 1946.
   (b) Wright, C. S. and Gross, E. R.: Topical Treatment with Penicillin Ointment, Arch. Dermat. & Syph. 55:52-56 (Jan.) 1947.
   (c) Neuroth, M. L. et al.: A Study of Penicillin Ointments and Creams, J. Am. Pharm. A. 35:321-324 (Nov.) 1946.
2. (a) Aldrich, C. A. and Holmes, C. A.: Treatment of Impetigo Neonatorum with Minimal Doses of Penicillin, Am. J. Dis. Child. 72:279 (Sept.) 1946.
   (b) Goldfarb, A. A.: A Case of Stevens-Johnson Disease Treated with Penicillin, J. Pediat. 28:579-589 (May) 1946.
3. Callaway, J. L., Arena, J. M., Noojin, R. O. and Riley, K. A.: Pemphigus, Successful Treatment with Penicillin, J. Pediat: 28:592-594 (May) 1946.

**Table 5(4)**

**Streptomycin Is of Apparent Value in**
- **Tuberculosis, Cutaneous**
- **Chancroid**
- **Dermatoses due to Proteus Vulgaris**
- **Dermatoses due to other gram-negative organisms**
- **Granuloma Inguinale**

**Streptomycin Is Not of Value in**
- **Syphilis, Cutaneous**

4 Gm. daily, and over a period of sixty to ninety days. The present cost of the drug makes it prohibitive for all but very wealthy patients unless it is available under research grants.

The use of streptomycin in the other dermatoses listed has been reported only in isolated cases or is still in the experimental stage. Streptomycin has not proven of value in the control of rabbit syphilis, and there is no indication that it will be of use in human syphilis.

### *Tyrothricin*

Tyrothricin, a mixture of gramicidin (25 per cent) and tyrocidin (60 per cent), is an antibiotic suitable for local use only. It is commonly used as a compress in an aqueous-alcoholic solution containing 100 mg. of tyrothricin per 100 cc. of liquid, or as "intraderm" tyrothricin, a specially prepared penetrating wetting agent. It is insoluble in saline solution and does not appear to be particularly effective in ordinary ointment bases.

Tyrothricin has proven useful in a number of cutaneous dermatoses of infectious origin (table 6). Its chief value seems to be in its lack of sensitizing properties, but its performance has not been dramatic as a rule. It may well be used when difficulties are encountered with penicillin or other proven types of medication, especially in chronic ulcerative conditions requiring prolonged treatment.

**Table 6(5)**

**Tyrothrycin May Be of Help in**
- **Furunculosis**
- **Ecthyma**
- **Folliculitis**
- **Decubitus Ulcer**
- **Acne Vulgaris Pustulosa**
- **Hemostatic Ulcer**
- **Impetigo Contagiosa**
- **Cellulitis, Acute and Chronic**
- **Sycosis Vulgaris**

**Tyrothrycin Has Not Been Helpful in**
- **Dermatitis Repens**

**Table 7(1c,6)**

**Penicillin**

1. **Modes of administration**
    - **a) Intramuscular**
    - **b) Intravenous**
    - **c) Topical**
2. **Toxic manifestations**
    - **a) Upon parenteral or oral administration**
        - **Urticaria**
        - **Erythema multiforme**
        - **Exfoliative dermatitis**
        - **"Serum sickness" reaction**
        - **Erythema**
    - **b) Upon topical use**
        - **Contact sensitization**

**Table 8(4,7)**

**Streptomycin**

1. **Modes of administration**
    - **a) Intramuscular**
    - **b) Intravenous**
    - **c) Topical**
    - **d) Oral use unsatisfactory**
2. **Toxic manifestations**
    - **a) Upon parenteral administration**
        - **Tinnitus (often severe)**
        - **Vertigo (often severe)**
        - **Deafness (may be permanent)**
        - **Various vesicular, papular, and erythematous eruptions**
    - **b) Upon topical use**
        - **None known**

**Table 9**

**Tyrothrycin**

1. **Mode of administration**
    - **Topical only, as this substance is too toxic for other use**
2. **Toxic manifestations**
    - **Few encountered thus far. Any substance may act as a sensitizer, however**

### *Problems for the Future*

As may be noted, only forty-odd skin conditions are listed in all the tables. There are more than three hundred well-defined entities in dermatology, and a large number of these are due to infectious agents, but it will

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4. (a) Hinshaw, H. C., Feldman, W. H., and Pfuetze, K. H.: Treatment of Tuberculosis with Streptomycin, J.A.M.A. 132:778-782 (Nov. 30) 1946.
   (b) O'Leary, P. A., Ceder, E. T., Hinshaw, H. C. and Feldman, W. H.: Treatment of Various Types of Cutaneous Tuberculosis with Promizole and Streptomycin, Arch. Dermat. & Syph. 55:222-232 (Feb.) 1947.
   (c) Herrell, W. E., and Nichols, D. R.: The Clinical Use of Streptomycin. Proc. Staff Meet., Mayo Clinic 20: 449-462 (Nov. 28) 1945.
5. Rankin, L. M.: The Use of Tyrothrycin in the Treatment of Ulcers of the Skin, Am. J. Surg. 65:391-392 (Sept.) 1944.
6. (a) Dressler, S. and Dwork, R. E.: Reactions to Penicillin, J.A.M.A. 133:849 (Mar. 22) 1947.
   (b) Vogel, H. R.: Reactions to Penicillin, Arch. Dermat. & Syph. 54:713 (Dec.) 1946.
   (c) Pillsbury, D. M., Steiger, H. P. and Gibson, T. E.: The Management of Urticaria Due to Penicillin, J.A.M.A. 133:1255-1258 (April 26) 1947.
   (d) Callaway, J. L. and Barefoot, S. W.: Immunological Studies on Patients Developing Urticaria Associated with Penicillin Therapy, J. Invest. Dermat. 7:285 (Dec.) 1946.
7. (a) Fowler, E. P., Jr. and Seligman, E.: Otic Complications of Streptomycin Therapy, J.A.M.A. 133: 87-91 (Jan. 11) 1947.
   (b) Keefer, C. S.: Streptomycin in Infections, J.A.M.A. 132:70-77 (Sept. 14) 1946.

require a much longer period of observation to obtain an evaluation of the usefulness of antibiotics in all of these dermatoses. Of the forty-odd discussed here, only three conditions are without any promise of cure—acute disseminated lupus erythematosus, dermatitis herpetiformis, and late cutaneous coccidioidomycosis. Perhaps some of the recently studied antibiotics, such as bacitracin, may offer hope for victims of these diseases in the future(8).

*Reasons for failure*

The following reasons may be listed for some of the failures with antibiotic therapy: (1) Not all bacteria and other infective agents are inhibited by our presently available antibiotics. (2) Apparently it is necessary to use them in an intensive fashion at the beginning of therapy, since there is considerable evidence that resistance to these agents may be induced when small initial doses are used. (3) Local and general hypersensitivity to penicillin develops in a relatively high percentage of cases (5 per cent or more) when it is used for more than a few days. (4) Due emphasis has not been placed upon the fact that the physician must make it possible for the antibiotic to reach the focus to be treated. (5) The antibiotics do not of themselves alter the individual's immunobiologic relationship with the underlying pathologic condition.

If these reasons for failure were generally recognized and the antibiotics were not expected to do all the work alone, our treatment results would undoubtedly improve. A recent surgical article states: "No available anti-bacterial agent can completely sterilize an open wound. Topical or local chemotherapy has been discarded as ineffective and deleterious."(9) The present discussion would lend support to this conclusion, although it is probable that topical therapy with antibiotics is not as often deleterious as it is ineffective.

*Toxic reactions* (tables 7, 8, and 9)

The relatively high incidence of toxic reactions to penicillin and streptomycin is a major drawback. The addition of a generalized urticaria, a simple erythema, or erythema multiforme to a relatively benign dermatosis may be startling to the patient, and is often very upsetting. An exfoliative dermatitis or a serum-sickness type of reaction, with painful swelling of the joints, may prove so serious as to prolong illness considerably, or to hospitalize a previously ambulatory patient. One of the anti-histamine drugs, benadryl or pyribenzamine, does help to alleviate most of these side-reactions, and may, if given concurrently, prevent their appearance. Occasionally, however, it will be necessary to stop the medicament because of the potential danger associated with a generalized exfoliative form of dermatitis, or a serum-sickness reaction. The vertigo and permanent deafness associated with the administration of streptomycin are very serious drawbacks to its use; in tuberculosis, however, the seriousness of the disease must be weighed against the dangers of the therapeutic agent.

### *Summary*

1. Penicillin is of great value in the treatment of certain microbial dermatoses due to penicillin-susceptible organisms.

2. Streptomycin may prove of help in cutaneous tuberculosis and dermatoses due to gram-negative organisms.

3. Tyrothricin is of value in chronic ulcerative dermatoses and in other skin conditions when prolonged medication is indicated.

4. Adherence to sound principles of dermatologic debridement and effective surgical drainage, and observance of the limitations of the antibiotics are necessary for satisfactory results in dermatologic therapy.

5. The untoward reactions to penicillin and streptomycin may be serious enough to necessitate discontinuance of therapy.

6. Suitable vehicles for the antibiotics and simultaneous parenteral administration in large dosage are prerequisites for successful topical therapy.

7. The propensity of penicillin to induce local and general hypersensitivity is a serious objection to its prolonged or repeated topical use.

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**Security versus liberty.**—Growing numbers of people are stressing security rather than liberty. Even when lip service is paid to the old ideals of freedom, many individuals show by their actions an increasing readiness to sacrifice limitations on organized power for the sake of security.—Evan W. Thomas: The Increasing Complexities of Medical Care, New York Medicine 3:22 (June 5) 1947.

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8. Meleney, F. L., and Johnson, B.: Bacitracin Therapy, J.A.M.A. 133:675-680 (Mar. 8) 1947.
9. Lyons, C.: Chemotherapy in the Management of Wounds, J.A.M.A. 133:215 (Jan. 25) 1947.

# CONGENITAL ANOMALIES OF THE SPINE AND BACKACHE

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The study of congenital anomalies of the spine in relation to backache is the study of structural weakness in relation to stress and strain.

The basic plan of nature for the vertebral column was that of a horizontal weight-bearing mechanism. As man's position has become more erect, the increase in the vertical weight-bearing function of the spine has not been matched by corresponding changes in the physical and mechanical make-up of that structure.

All body weight above the pelvis is now carried by the lumbosacral articulation. It is at this point that the need for efficacy of design and integrity of structures is greatest. We find here, however, a joint poorly adapted to weight bearing, and one in which the percentage of congenital anomalies is greater than at any other point.

The articular plane of the first sacral vertebra is normally 15 to 20 degrees below horizontal; this angle creates an incline down which the fifth lumbar vertebra would slide, were it not for the restraint offered by the articular facets, the spinal and sacrospinal ligaments, and the sacrospinalis muscle. The normal curvature of this part of the spine partially distributes this strain throughout the lumbar vertebral structures, but the burden of maintaining its integrity is borne by the ligaments, muscles, and articulations of the lumbosacral area.

The usual congenital anomalies found in this region are, in order of frequency, as follows:

1. Faulty fusion (spina bifida, manifest or occult)
2. Asymmetric articular facets
3. Transitional vertebrae
    (a) Sacralization of the fifth lumbar vertebra —unilateral or bilateral, with or without synarthrosis
    (b) Lumbarization of the first sacral vertebra —unilateral or bilateral
4. Prespondylolisthesis of the fourth or fifth lumbar vertebra, or both
5. Spondylolisthesis—the fourth on the fifth lumbar vertebra, the fifth lumbar vertebra on the first sacral vertebra, or (rarely) the first on the second sacral vertebra.

Certain other anomalies may be added to this group, although they involve structures other than the lumbo-sacral spine:

1. Wedged vertebra of the dorsal area
    - Transverse (hemivertebra), producing scoliosis
    - Anteroposterior, producing kyphosis
2. Other congenital anomalies producing postural abnormality
    - Pelvic anomalies
    - Difference in leg length
    - Clubfoot and other pedal anomalies
    - Paralysis from a birth injury, affecting the trunk or extremities.

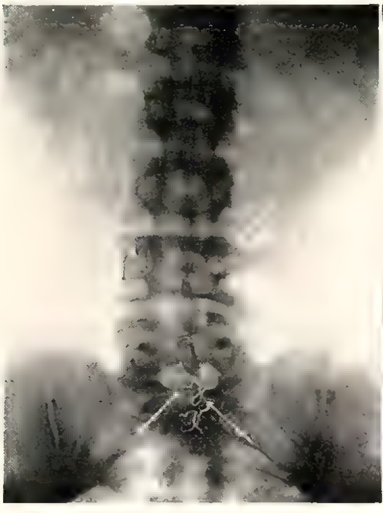

Fig. 1. Incomplete fusion of the first and second sacral vertebrae, together with asymmetric facets throughout the lower lumbar spine.

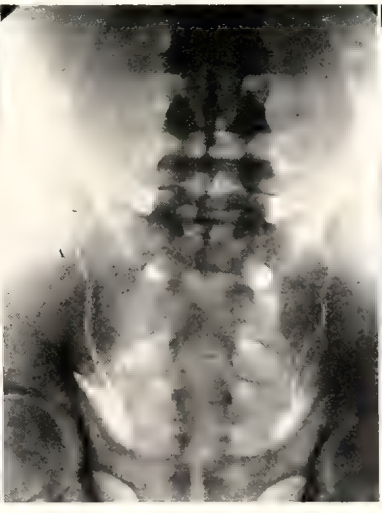

Fig. 2. Bilateral sacralization of the fifth lumbar vertebra.

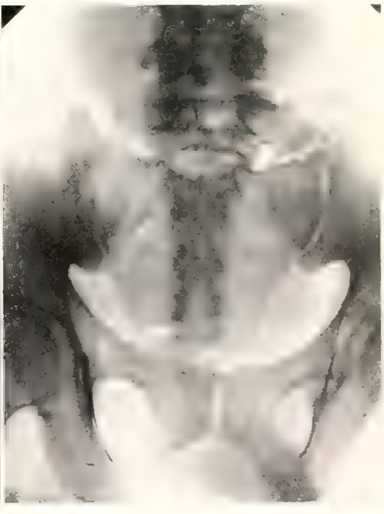

Fig. 3. Unilateral sacralization of the fifth lumbar vertebra, with the formation of pseudoarthrosis. Note arthritic changes in the pseudoarthrosis.

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Read before the Catawba Valley Medical Society, Lenoir, February 18, 1947.

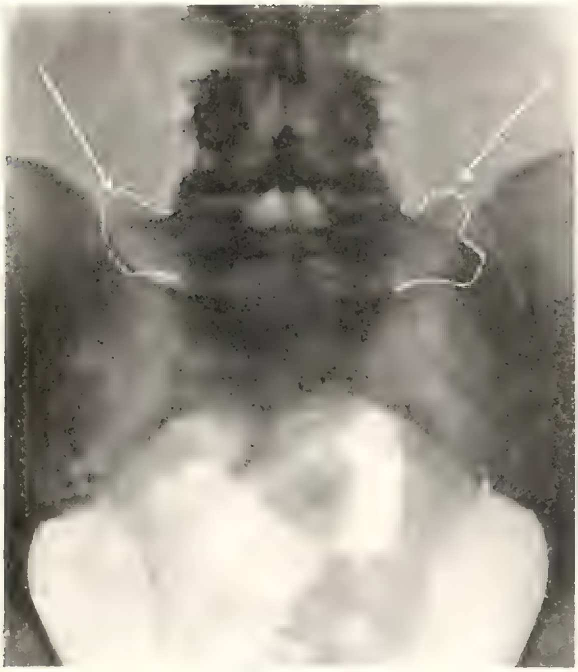

Fig. 4. Bilateral lumbarization of the first sacral vertebra.

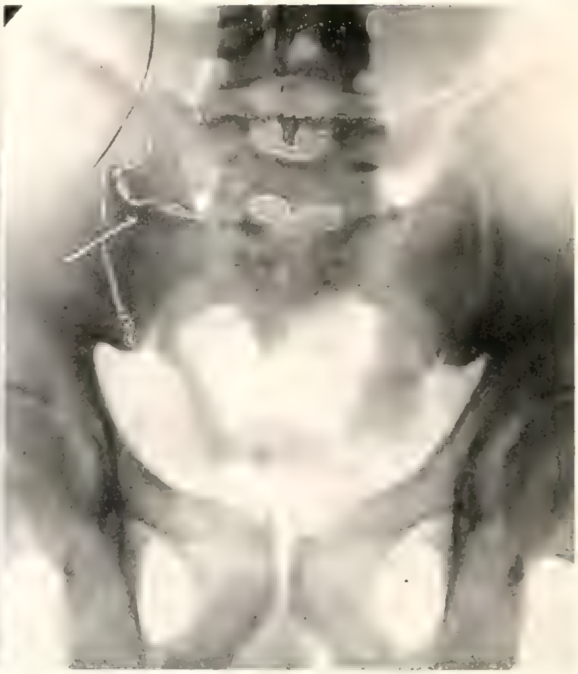

Fig. 5. Unilateral complete lumbarization of the first sacral vertebra, with pseudo-arthrosis of the opposite, partially lumbarized segment, and arthritic changes in this structure.

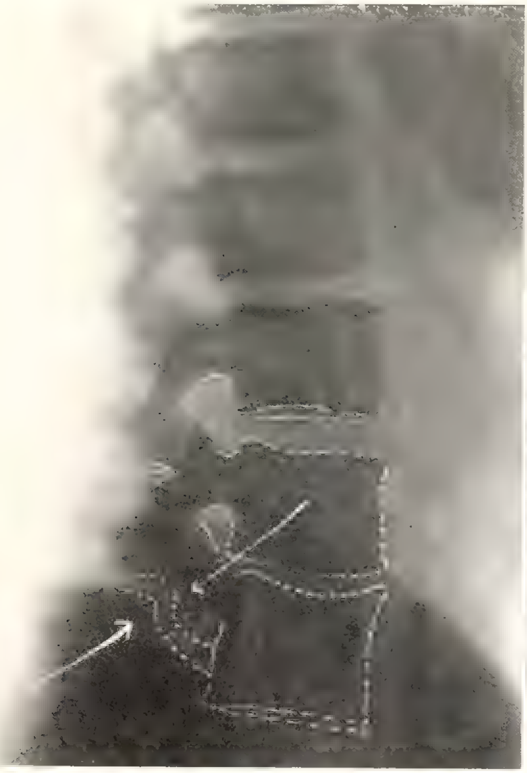

Fig. 6. Defect of continuity of the posterior neural arch of the fifth lumbar vertebra, without displacement (prespondylolisthesis).

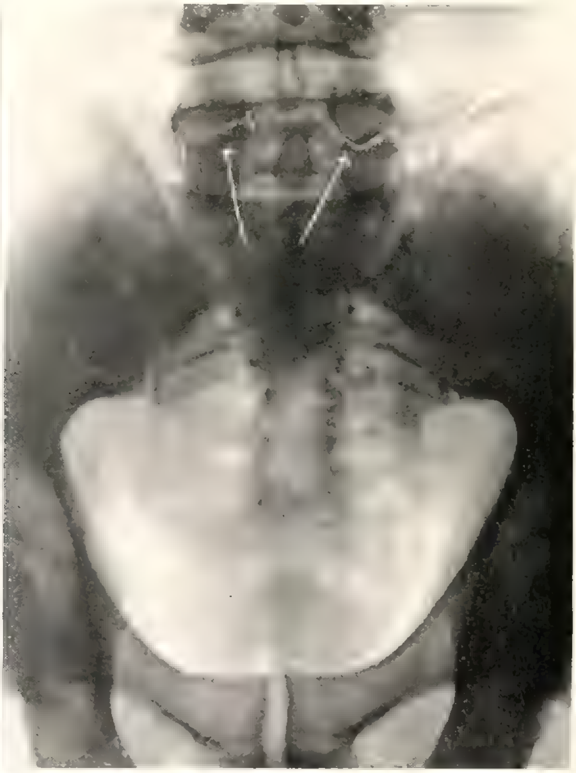

Fig. 7. Anteroposterior view of bilateral defect of continuity in the pars interarticularis.

*Faulty fusion* is inevitably associated with faulty ligamentous and muscular development. When the integrity of the neural arch is absent, the attachments of ligaments and muscles are correspondingly reduced; the local area is weaker, and a greater strain on structures above and below that level is produced. Such an area is more easily subject to strain or sprain.

*Asymmetric facets* limit the excursion of an articulation, and by so doing place greater demand upon contiguous structures. They also create torsional strain, the effects of which may be transmitted to other levels.

*Sacralization of the fifth lumbar vertebra,* if bilateral, produces complete immobilization of the lumbosacral joint, thus demanding greater mobility of the remaining lumbar structures, and placing a greater strain upon them. If the process is unilateral, marked torsional strain may be added to the burden of the superjacent structures.

*Bilateral lumbarization of the first sacral vertebra,* for all practical considerations, adds another segment to the lumbar spine, decreasing the structural solidarity of that area, and increasing strain upon structures governing its functions. Since the sacro-iliac articulations are reduced by one segment, the functions of the lumbo-sacral joint are transferred, to a certain extent, to the articulation of the first and second sacral vertebrae. Inasmuch as neither the ligamentous attachments nor the intervertebral structures of this joint were designed for this function, this area suffers from the effects of such added strain.

As in the case of sacralization, unilateral lumbarization adds torsional strain to the burden of the first sacral vertebra and superjacent segments.

In *prespondylolisthesis,* the defect of continuity of the posterior neural arch is bridged by a fibrocartilaginous material. In this condition maximum function of the muscles and ligaments must be constantly maintained to prevent the separation of the weakened area, and the consequent forward-slipping which may occur (spondylolisthesis).

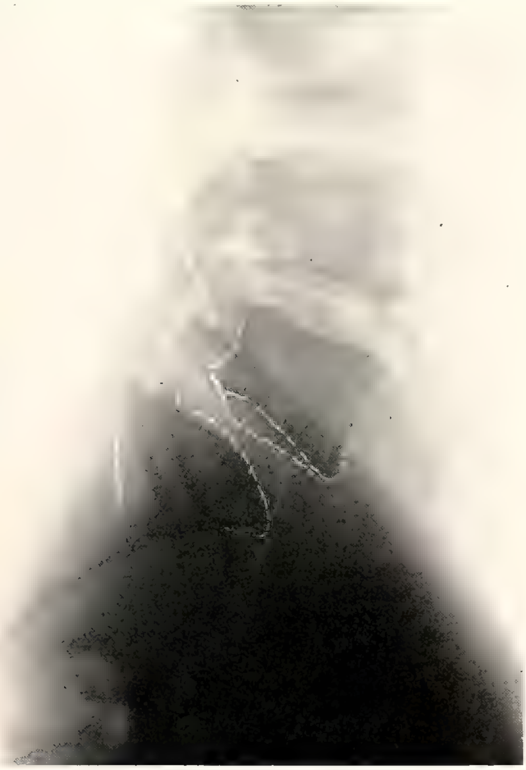

**Fig. 8. Posterior neural arch defect of the fifth lumbar vertebra, with questionable slight forward displacement of the fifth lumbar vertebra on the first sacral vertebra (prespondylolisthesis? spondylolisthesis?).**

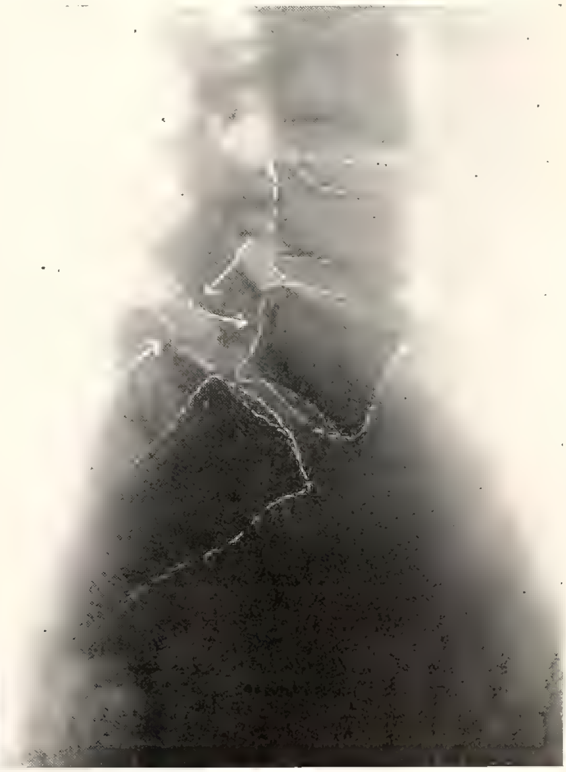

**Fig. 9. Marked defect in continuity of the posterior neural arch of the fifth lumbar vertebra. Slight forward displacement of the fifth lumbar vertebra and the first sacral vertebra is noted (spondylolisthesis).**

In *spondylolisthesis,* the mechanical disturbance produced by the slipped vertebra is added to the strain of supporting the weakened area.

Whenever either prespondylolisthesis or spondylolisthesis of the articulation of the first and second sacral vertebrae occurs coincident with lumbarization of the first sacral vertebra, the mechanical disturbance is markedly exaggerated. Such a combination is, however, relatively rare.

A *wedged vertebra,* through the production of either scoliosis or kyphosis, may produce postural strain of other segment levels; it may also produce torsional strain, if the wedging be in the oblique plane.

*Developmental anomalies of the pelvis, lower extremities, dorsal, or cervical region* may create low-back strain through the postural situations they produce. Low-back pain may thus be due to a tilted pelvis, a spinal list, a shoulder droop, or a torticollis as readily as to an anomaly of the lumbosacral region.

Routine roentgenologic studies prove that many congenital anomalies of the spine may exist asymptomatically. Whenever backache and spinal anomaly co-exist, however, the probable causal relationship between the structural defect and the clinical picture must be considered.

### *Summary*

Congenital anomalies of the lumbosacral spine may be responsible for weakness and strain of the lower back.

Certain other congenital anomalies may contribute to low-back strain through the postural situations they produce.

The structural weakness represented by congenital spinal anomaly may be a predisposing factor in the development of clinical symptoms.

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**Allowing the patient to talk.** Although time consuming it is important to allow the patient to tell his story with as few interruptions as possible because in this way important associations are obtained and the ground work laid for a good relationship with the patient. Occasionally the patient has to be led back to a discussion of the present illness, but aside from such interruptions it is best to allow him to tell the story in his own way. Then one may go over the history in chronologic order with questions regarding the very first evidences of illness.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:160 (Nov.) 1946.

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# MILK SICKNESS

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Milk sickness is an intoxication in human beings which is caused by the ingestion of milk and milk products of cows which have eaten white snakeroot (Eupatorium urticaefolium) or rayless goldenrod (Aplopappus heterophyllus). It may be acute or subacute, and probably may become chronic or relapsing. The primary intoxication in animals is known as "trembles" or "split-tail."

Hardin's report in 1934 reviewed his experience with milk sickness at this hospital(1). Since this report was published, 21 additional cases have been seen here. Between 1941 and 1946 only one patient with acute milk sickness was admitted, but in the past year we have seen 3 cases of this disease, with one fatality.

## *Case Reports*

### *Case 1*

W. L. P., a white farmer 53 years of age, entered Grace Hospital on August 18, 1946. During the preceding five weeks he had suffered from severe and persistent nausea, loss of appetite, weakness, and obstinate constipation. The presence of white snakeroot on his farm was denied; milk sickness had not occurred there for at least fifty years. No other member of his family was suffering from similar symptoms, but it was noted that he alone had a decided predilection for cream and butter.

Some days prior to admission barium studies of the stomach and gastric analysis were performed in the hospital clinic, with negative findings. The diagnosis of milk sickness was then made, and the ingestion of brandy and honey to the point of intoxication was prescribed. Three days of such treatment at home was unavailing because of violent emesis and increasing prostration. The patient was then brought to the hospital.

The outstanding physical findings on admission were paroxysmal unproductive retching, considerable dehydration, and alcoholic intoxication. Routine laboratory determinations were normal. Large quantities of brandy were given by gavage, and infusions of glucose were given by vein. Treatment was discontinued on the third hospital day, and he was able to tolerate a liquid diet without vomiting. He was discharged on August 23, 1946. At last report, six months later, he remains weak, listless, without appetite, and unable to engage in strenuous work.

### *Case 2*

H. J., a 3-year-old white boy, was brought in coma to Grace Hospital on November 8, 1946. For three days he had been languid and without appetite, and for two days he had vomited copiously. Shortly

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Read before the Avery County Medical Society, April 25, 1947.

1. Hardin, R. H.: Milk Sickness, Virginia M. Monthly 61: 528-531 (Dec.) 1934.

before admission he had a generalized clonic convulsion, followed by stercoraceous vomiting and coma. When he was admitted, the reflexes were absent. He was cyanotic, and was obviously suffering from acute pulmonary edema. Intranasal oxygen was given with no benefit, and he expired before further studies could be performed.

Permission for autopsy was refused, and the diagnosis was entirely speculative. Shortly afterwards, however, Dr. B. B. McGuire, county health officer, reported that he had visited the child's home and had found an abundant growth of white snakeroot on the farm. He was fully satisfied that the death had been due to milk sickness. This case has been previously reported(2).

### *Case 3*

N. J., an 11-year-old sister of the deceased child, was brought to Grace Hospital on November 12, 1946, because of loss of appetite and vomiting for three days. The mother and a sister were likewise affected. A pint of brandy given the patient over a period of a few hours shortly before admission had not caused intoxication nor alleviated the symptoms. The father reluctantly admitted that considerable quantities of white snakeroot grow on his farm, that he himself had had milk sickness in the past, and that two years previously a calf had died of trembles.

The patient was only very slightly ill; physical findings were normal, and the laboratory examinations were unremarkable. She responded promptly to parenteral fluids.

## *Milk Sickness in History*

Milk sickness is now a curiosity accorded but a few lines in the standard medical texts. In the first half of the nineteenth century, however, it constituted a major problem on the Western frontier. Widespread interest in the disease created a voluminous literature which is catalogued in the exhaustive bibliographies of Jordan and Harris(3a), Wolf, Curtis and Kaupp(3b), and Moseley(3c). There is a probably apocryphal belief that milk sickness was encountered by the explorer Hennepin(3a). There is good evidence that it prevailed in North Carolina prior to 1776, and in Tennessee, Kentucky, and Ohio from the time of the earliest settlements(3b,c,4). Half the deaths occurring in DuBois County, Indiana, in 1815, and a quarter of the deaths amongst the early settlers of Madison County, Ohio, were attributed to milk sickness(3a). It was, of course, a scourge to cattlemen. Perhaps the most famous victim of the disease was Lincoln's mother. The relevant passage from Nicolay and Hay(5) suggests a number of corollary problems which will be subsequently discussed:

> "In the autumn of 1818 the little community of Pigeon Creek [Indiana] was almost exterminated by a frightful pestilence called the milk-sickness, or, in the dialect of the country, 'the milk sick'. It is a mysterious disease which has been the theme of endless wrangling among western physicians, and the difficulty of ascertaining anything about it has been greatly increased by the local sensitiveness which forbids anyone to admit that any well-defined case has ever been seen in his neighborhood, 'although just over the creek (or in the next county) they have had it bad'. It seems to have been a malignant form of fever—attributed variously to malaria and to the eating of poisonous herbs by the cattle—attacking cattle as well as human beings, attended with violent retching and a burning sensation in the stomach, often terminating fatally on the third day. In many cases those who apparently recovered lingered for years with health seriously impaired . . . The Sparrows, husband and wife, died early in October, and Nancy Hanks Lincoln followed them after an interval of a few days."

Disastrous epidemics such as these were frequent, and if they did not kill the pioneer or force him back to his native home, they drove him still further westward—as was the case with the Lincoln family(6). Outbreaks have been recorded at one time or another in western North Carolina, Tennessee, West Virginia, Georgia, Pennsylvania, Ohio, Indiana, Illinois, and Missouri(3c).

During the past seventy-five years the disease has virtually disappeared from older and intensively cultivated areas, for the simple but belatedly recognized reason that white snakeroot has been eradicated. Nonetheless, the disease persists endemically in certain remote and less developed agricultural regions. Milk sickness has probably occurred annually for the past one hundred and seventy years in western North Carolina, chiefly in Avery, Watauga, and Caldwell Counties, and in the adjacent areas of Tennessee(3c,7). In White County, Tennessee, Milk Sick Mountain, which within the memory of living residents was fenced off, commemorates the pestilence(8). During the past decade an outbreak has been reported in Illinois(9). For the last sixty years the syndrome, known locally as alkali poisoning, has been prevalent in the Pecos Valley of New

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2. McGuire, B. B.: Child Dies of Milk Sick Poisoning, Health Bull. (N. C. State Board of Health) 61:7-8 (Dec.) 1946.
3. (a) Jordan, E. O. and Harris, N. MacL.: Milksickness, J. Infect. Dis. 6:401-491 (Sept. 20) 1909; (b) Wolf, F. A., Curtis, R. S. and Kaupp, B. F.: A Monograph on Trembles or Milksickness and White Snakeroot, N. C. Agric. Exper. Station Tech. Bull. 15 (July) 1918; (c) Moseley, E. L.: Milk Sickness Caused by White Snakeroot, published jointly by the Ohio Academy of Science and the author, Bowling Green, Ohio, 1941.
4. Sackett, W. G.: The Connection of Milk Sickness with the Poisonous Qualities of White Snakeroot (Eupatorium Urticaefolium), J. Infect. Dis. 24:231-259 (March) 1919.
5. Nicolay, J. G. and Hay, John: Abraham Lincoln: A History, New York, The Century Co., 1890, v. I, pp. 30-31.
6. Stenn, F.: The Pioneer History of Milk Sickness, Ann. M. Hist. 89:23-29 (Jan.) 1937.
7. (a) Richardson, W. P.: The Milk Sickness or Trembles: Report of Five Cases, South. Med. and Surg. 93:731-732 (Oct.) 1931; (b) Milam, D. F.: Milk Sickness in North Carolina, South. Med. and Surg. 96:278-279 (June) 1934.
8. Metcalf, R. B.: Personal communication.
9. Gowen, G. H.: Milk Sickness, Illinois M. J. 74:447-452 (Nov.) 1938.

Mexico, in West Texas, and in Arizona(10).

### *Description of Milk Sickness*

A classic description of milk sickness, which can be little improved, was published in 1810 by Drake of Cincinnati, and is reprinted by Jordan and Harris(3a). The primary intoxication in herbivorous animals is known as "trembles." Pictures and vivid descriptions of trembles are given by numerous authorities, all of whom agree that its manifestations are identical with those of the human ailment(3a,b,10b,11). The popular names attached to the human disease characterize it succinctly: bloody murrain, puking fever, river sickness, sick stomach, slows, staggers, stiff joint, swamp fever, tires, trembles(3a,b,4,7,9,10a,11b,12).

The latent period is unknown, but observation would indicate that the toxin exerts a cumulative effect for at least a few days. The prodromal symptoms are typically loss of appetite, languor, fatigability, and vague muscular pain. Strenuous exertion may precipitate trembling and even convulsions. This phenomenon was early noted in cattle, and before concluding a purchase the canny buyer would insist first on driving the animals hard(13). Bowel action becomes so sluggish that obstipation is usually a prominent complaint. Persistent nausea, with a sensation of epigastric burning and heaviness, supervenes.

In the mild or chronic intoxications malnutrition may become extreme and these vague symptoms may persist for months, with ultimate spontaneous recovery. Physical overexertion or an increased consumption of contaminated milk products, however, may precipitate persistent gagging, retching, and vomiting, which soon lead to progressive dehydration, acidosis, and collapse. The individual is dull and utterly wretched, and prefers death to continued suffering. This acute phase may last from a few days to one or two weeks, and often terminates fatally. The physical findings are those of marked dehydration. The temperature is invariably normal, except perhaps terminally. There is no leukocytosis.

Convalescence is protracted by marasmus and asthenia. It is said that some individuals never fully recover their original physical capacity. Severe and sometimes fatal relapse may follow premature exertion. Characteristically, the individual becomes easily overheated, weak, and sick for months following apparent recovery.

Morbidity and mortality statistics are not available. A death rate of 20-25 per cent has been independently computed by Jordan and Harris(3a) and by Wolf, Curtis, and Kaupp(3b) in more than 300 cases culled from essentially the same sources. The mortality is, however, undoubtedly far lower if the mild and subclinical intoxications are included. On the other hand, it is likely that not a few fatal cases have been missed(12b). Acute gastroenteritis, conversion hysteria, the chronic debilitating diseases, the intoxications, and the whole roster of causes of acidosis, coma, and convulsions must, at least from the academic standpoint, be considered in the differential diagnosis. Unfortunately there are no pathognomic physical or laboratory findings in milk sickness. The diagnosis is, however, suggested in a rural community when several members of a family who are consuming milk from the same cow or cows develop this train of symptoms.

### *Analysis of Cases Seen at Grace Hospital*

A review of the cases of milk sickness treated at this hospital (which is located centrally in the endemic area of western North Carolina) confirms this general description. Of a total of 31 cases recorded from 1930 through 1946, 11 have been excluded because of doubtful diagnosis or inadequate records. Analysis of the remaining 20 reveals an approximately equal sex distribution. The ages of the patients ranged from 3 to 55 years, the mean being 25.

The average duration of symptoms prior to admission was two weeks. Nausea and vomiting were present in all patients, profound fatigability in a majority, constipation in about one half, and muscular pain of some description in about one third. In a number of instances there were chills,

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10. (a) Marsh, C. D., Roe, G. C., and Clawson, A. B.: Rayless Goldenrod (Aplopappus Heterophyllus) as a Poisonous Plant, U. S. Dept. Agric. Bull. No. 1391 (May) 1926; (b) Marsh, C. D.: Trembles, U. S. Dept. Agric. Farmer's Bull. No. 1593 (June) 1929.
11. Clay, A. J.: Milk-Sickness, in Tice's Practice of Medicine, Hagerstown, Md., W. F. Prior Co., v. VIII:123-130, 1941.
12. (a) Walsh, W. E.: "Milk Sick," or White Snakeroot Poisoning, J.A.M.A. 87:555-556 (Aug. 21) 1926; (b) Walsh, W. E.: Milk Sickness, Illinois M. J. 58:454-457 (Dec.) 1930; (c) Wilkinson, G. R.: Milk Sickness, South. M. J. 18:797-800 (Nov.) 1925; (d) Knight, H. W.: Milk Sickness Due to White Snakeroot (Eupatorium Urticaefolium), South. Med. and Surg. 97:142-143 (March) 1935.
13. Way, J. H.: The Clinical History, Nature, and Treatment of "Milk-Sickness," Am. J. M. Sc. 96:307-316 (Sept.) 1893.

trembling, and emotional instability. Five patients became stuporous or semicomatose prior to hospitalization. The two fatalities fell in this group. In 3 cases there had been convulsions.

Physical examination in the majority of cases showed the temperature to be subnormal; in no instance was a temperature in excess of 100.2 F. recorded. The pulse and respirations were for the most part normal. The blood pressure determinations recorded were within normal limits. Varying degrees of dehydration were noted in a majority of the patients; in 6 there was obvious evidence of acidosis. In one instance a typical pleuritic friction rub was noted, doubtless of the type recently described in diabetic precoma(14). A scaphoid abdomen and epigastric and lumbar tenderness were frequent findings.

Minimum laboratory examinations were performed in about one half the cases. Where urinalyses were recorded, the urine was consistently acid and of high specific gravity; albuminuria was present in a third of the entire series, and acetonuria in a third. In all cases the leukocyte, erythrocyte, and hemoglobin levels were essentially normal. A few nonprotein nitrogen determinations were done, and in only one instance was an elevation found. The few blood sugar determinations done were all normal.

The average duration of hospitalization was one week. Autopsy was not performed in either of the fatal cases.

### *Etiology*

Drake correctly attributed milk sickness to the ingestion by cows of an unknown herb. His contemporaries, however, entertained other theories which to some extent remain locally current: that dew-laden grass is poisonous; that miasmas arise from polluted soil; that toxic amounts of aluminum, arsenic, cobalt, or lead are present in the grass of dangerous pastures; that cattle may be infected by noxious flies, spiders, or mushrooms(3). It was long thought in Pecos Valley that alkaline minerals cause the disease. As early as 1840, isolated individuals had recognized that cattle who eat white snakeroot come down with trembles and that human beings who drink their milk in turn develop milk sickness(3). An authentic instance of human intoxication caused by the accidental ingestion of white snakeroot was recorded in the mid-century(4). Not until 1906, however, was the toxicity of white snakeroot to animals critically demonstrated by Moseley(3c). His work was promptly refuted by Crawford, who unfortunately employed aqueous extracts of the weed(15). His negative report, sponsored by the Department of Agriculture, delayed recognition of the etiology of the disease. Shortly afterwards, Jordan and Harris investigated an outbreak of trembles in the Pecos Valley. From animal material, feces, and soil they isolated the so-called Bacillus lactimorbi, which in two impressive reports was proposed as the pathogenic agent of milk sickness(3a,16). The fact that milk sickness exists in the Southwest despite the absence of white snakeroot lent further plausibility to their contention. The failure of others to confirm their findings, and the strong resemblance of B. lactimorbi to the ubiquitous hay bacillus have caused the infectious theory to be relegated to the medical limbo.

Clay(11) in 1914, Marsh and Clawson(17) in 1917, Wolf, Curtis and Kaupp(3b) in 1918, and Sackett(4) in 1919 incontrovertibly established that ingestion of white snakeroot consistently produces trembles in a variety of experimental animals. Finally, in 1919, Marsh, Roe and Clawson(10a) demonstrated that the rayless goldenrod of the Southwest likewise causes trembles in the experimental animal. A sibling of this plant, Aplopappus fructicosus, has been subsequently found to be equally toxic(18).

The proposition that milk sickness is transmitted to man by the milk of cows which have ingested either white snakeroot or rayless goldenrod has never been experimentally established, for obvious reasons. The evidence is circumstantial, but nonetheless overwhelming. Gowen states that in each of 21 cases of milk sickness investigated

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14. Armanino, L. P. and Ory, E. M.: Acute Pleurisy as a Dehydration Phenomenon in Diabetic Precoma, Am. J. M. Sc. 211:597-601 (May) 1946.
15. Crawford, A. C.: The Supposed Relationship of White Snakeroot to Milk Sickness or "Trembles," U. S. Dept. Agric. Bureau of Plant Industry, Bull. No. 121:3-20 (April 18) 1908.
16. (a) Jordan, E. O. and Harris, N. MacL.: The Cause of Milk Sickness or Trembles, J.A.M.A. 50:1665-1673 (May 23) 1908; (b) Luckhardt, A. B.: Additional Notes on the Bacteriology and Pathology of Milksickness, J. Infect. Dis. 6:492-505 (Sept. 20) 1909.
17. Marsh, C. D. and Clawson, A. B.: Eupatorium Urticaefolium as a Poisonous Plant, J. Agric. Research 11:699-716 (Dec. 24) 1917.
18. Couch, J. F.: Trembles (or Milk Sickness), U. S. Dept. Agric., Circ. No. 306 (Nov.) 1933.

by him, cattle had been turned to forage in wooded areas where white snakeroot was identified; the animals developed trembles, and in turn those who drank their milk developed the intoxication(9). Culpepper describes his own case of milk sickness, acquired from the milk of his cow, which three days previously had eaten rayless goldenrod(19). Numerous observers have claimed that the meat of animals dead of trembles is toxic, although at least two investigators have failed to substantiate this belief(3b,4).

### *Tremetol*

In 1927 Couch announced the successful extraction from white snakeroot of a pure toxic substance, which he called tremetol(20). This substance uniformly causes trembles in the experimental animal. In 1930 he isolated tremetol from the rayless goldenrod(21). Tremetol is obtained, by a series of alcohol and ether extractions, as an aromatic, straw-yellow, thick oil. The compound is a levorotatory secondary alcohol. The probable empirical formula is $C_{16}H_{22}O_3$ and includes a phenyl ring with a sidechain containing two double bonds. According to Couch, it can be recovered in quantity from both dry and fresh rayless goldenrod, but only from fresh white snakeroot, although it has been long maintained that the dry weed remains poisonous. Although readily oxidized, tremetol is unaffected by the heat of pasteurization. Two other toxic substances are contained in snakeroot, but tremetol alone produces trembles.

Tremetol has not been identified in contaminated milk, although Couch has produced trembles in experimental animals with butter made of contaminated milk(22). It is thought that in the course of metabolism some change is wrought in its configuration without alteration of toxicity. Presumably lactation exerts a protective effect in the cow, for cows which have given poisonous milk for some time may not be affected by trembles until the milk supply fails. It has frequently been observed that the severest cases of milk sickness are occasioned by an inordinate consumption of cream and butter, and it is probable that tremetol occurs in high concentration in the fatty part of the milk. The local mountaineers believe that the toxin may be seen as minute greenish globules on the top of milk.

### *Description of Plants Responsible for Milk Sickness*

In the light of present knowledge, it is evident that trembles and hence milk sickness may occur in any area where white snakeroot or rayless goldenrod abounds. Of the forty-odd members of the Eupatorium family, white snakeroot alone is toxic. Apparently it grows only in this country, for milk sickness has never been described elsewhere. It is known popularly as white or Indian samicle, richweed, deerwort, boneset, white top, squaw weed, steria, and poolwort(3c,23). Its season is from July through November. It grows in rich, moist soil, such as is found in timbered and uncleared areas. Locally, at least, it luxuriates in the wet bottoms of mountain coves. Cattle dislike it but will eat it of necessity in unusually dry spells, when they are driven to forage in shaded, still verdant areas. Hence milk sickness most commonly occurs in dry years. The weeds in dry hay are said to remain poisonous(1). The plant grows throughout the eastern half of the United States. The variation in toxicity from year to year and from region to region has not been satisfactorily explained(20b).

Cultivation of the soil eliminates the weed. Although the region served by this hospital has been farmed for many generations, many of the upland pastures remain only partially cleared, and here the plant may often be found. Few farmers will admit the presence

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19. Culpepper, M. B.: Milk-Sickness Erroneously Called Alkali Poisoning, Southwestern Med. 10:391-393 (Sept.) 1926.
20. Couch, J. F.: (a) The Toxic Constituent of Richweed or White Snakeroot (Eupatorium Urticaefolium), J. Agric. Research 35:547-576 (Sept. 15) 1927; (b) Milk Sickness, The Result of Richweed Poisoning, J.A.M.A. 91:234-236 (July 28) 1928; (c) Tremetol, The Compound that Produces "Trembles" (Milksickness), J. Am. Chem. Soc. 51: 3617-3619 (Dec.) 1929.
21. Couch, J. F.: The Toxic Constituent of Rayless Goldenrod, J. Agric. Research 40:649-658 (April 1) 1930.
22. Couch, J. F.: Trembles (Milk Sickness) Produced by Toxic Butter, Vet. Med. 36:244-245 (May) 1941.
23. "It blooms in September, and has a white blossom of the corymb type, consisting of a cluster of flowers, each on its own foot stalk and arising from a common axis, and each having a fringy bloom. The stalk is from one to four feet high, with a square stem, and has opposite petioled leaves broadly oval at the base, taper-pointed, coarsely toothed, three-ribbed and veined, thin and easily skeletonized by insects . . . The leaves grow in pairs from alternate sides of a stalk, so that each pair is at right angles to the pair above or below it . . . The roots . . . grow only about three inches deep . . . The plant thrives well in dry weather, the leaves and stem remaining green when neighboring plants are parched."(11)

of snakeroot on their property—often because they do not recognize the plant or refuse to believe that it causes milk sickness, but more often because the very rumor vastly depreciates the resale value of their land.

Rayless goldenrod or jimmy weed is found from southern Colorado to the Texas Panhandle and south to Arizona, Sonora, and Chihuahua(24). It grows luxuriantly along irrigation ditches, and, like white snakeroot, is eaten by cattle only in lieu of more palatable fodder(10a).

### *Pathology and Pathologic Physiology*

Postmortem examinations have been reported on only 3 human victims of milk sickness(3a). The few detailed protocols are on animals. The salient findings have been consistently enlargement and fatty metamorphosis of the liver, occasionally so extreme as to render the histologic structure almost unrecognizable; fatty infiltration of the heart; acute parenchymatous nephritis; hyperemia of the stomach and intestines, and hyperplasia of Peyer's patches(3a,b). The human subjects showed essentially the same changes. Adequate studies of the brain have not been made.

The morbid physiology of milk sickness is obscure, since the disease is now confined to remote rural areas where laboratory facilities are inadequate. Walsh, early in this century, was apparently first to recognize the acidosis(25). He has since suggested that the toxin impairs the power of the liver to store glycogen, and that hypoglycemia is of constant occurrence. The evidence to support this hypothesis is that one of his convalescent patients was found to have a normal glucose tolerance test but an impaired levulose tolerance test, and that 3 patients with acute milk sickness were found to have rather low blood sugars, despite previous treatment with glucose(12b).

The degree of acetonuria produced in the experimental animal by the ingestion of fresh white snakeroot is said by Bulger, Smith, and Steinmeyer to be far greater than that produced by starvation alone. These workers found hyperlipemia and hypoglycemia, with terminal convulsions, to be frequent in the rabbit, although these effects were by no means regularly produced. Their animals exhibited no impairment of nitrogen metabolism(26). Cartland, Heyl, and Neupert, using dried white snakeroot, were unable to reproduce the severe hypoglycemia described by Bulger and his coworkers, and found only a mild, irregular hypoglycemia without the production of trembles or any toxic effect on the liver and kidneys(27). Couch, working with poisoned sheep, has found a persistent hyperglycemia(20a). Pritchett, of this hospital, has likewise found hyperglycemia in the fatally poisoned sheep(28).

The accumulation of guanidine as a result of tissue destruction has been proposed as an explanation of the action of snakeroot(29). The possibility that tremetol may also be a neurotoxin has not been explored. No plausible explanation of the pathogenesis of the acute intoxication or of the prolonged, if not permanent, disability following apparent recovery has yet been suggested. A fascinating, if somewhat recondite, avenue of further investigation lies open.

### *Treatment*

Treatment at present remains entirely empirical. The traditional lay treatment in these mountains has long been the administration of honey and brandy to the point of extreme intoxication—a practice in Hardin's opinion not lightly to be dismissed. In his experience cases not so treated have a poorer prognosis(1). Clay(11), Lambert(30), and Way(13), to name a few, likewise warmly ad-

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24. "The plant is a stout, erect, tufted perennial herb with a shrubby or near shrubby base, minutely hairy to nearly smooth, commonly from one to two feet in height, but sometimes under favorable circumstances of growth, as on banks of irrigating ditches, it may reach a height of four feet or even more.

    "The leaves are alternate, linelike or broader, one-eighth to one-fourth inch wide, three-fourths to two and one-half inches long, usually with stout, stiff hairs on the margin, occasionally with short, sharp, scattered teeth, and acute or obtuse at the apex.

    "The heads are numerous, with or without stems, in terminal flat-topped bunches; the bracts surrounding the flower heads are about one-eighth inch high, oblong, usually obtuse, with obscurely green tips. The tips have seven to fifteen tubular yellow flowers. The seeds are silky and small."(10a)

25. Editorial: Milk Sickness, or "Trembles," J.A.M.A. 87: 1835 (Nov. 27) 1926.
26. Bulger, H. A., Smith, F. M. and Steinmeyer, A.: Milk Sickness and the Metabolic Disturbances in White Snakeroot Poisoning J.A.M.A. 91:1964-1966 (Dec. 22) 1928.
27. Cartland, G. F., Heyl, F. W. and Neupert, F. F.: The Hypoglycemic Properties of White Snakeroot (Eupatorium Urticaefolium), J. Am. Pharm. A. 20:448-451 (May) 1931.
28. Pritchett, J. B.: Unpublished data.
29. Cutter, J. T., cited by Moseley(3c).
30. Lambert, C. F.: Milk Sickness, South. Med. and Surg. 99: 165-166 (April) 1937.

vocate this treatment, although other workers have obtained good results by the enteral and parenteral administration of water, physiologic saline solution, crude or pure glucose, and sodium bicarbonate. The rationale of the brandy treatment is that tremetol is partially detoxified by esterification with the alcohol(1). Certainly nausea is alleviated by the induction of an alcoholic stupor. It remains to be proved, however, that vomiting is a local rather than a central effect of tremetol, or that a significant amount of unfixed toxin is present in the stomach by the time treatment is instituted. It would appear reasonable that similar improvement might be obtained by heavy barbiturate narcosis. Evacuation of the bowels is generally recommended.

The therapeutic regimen employed by Hardin at this hospital consisted in the administration of brandy and honey to the point of intoxication, duodenal drainage, proctoclyses of sodium chloride and sodium bicarbonate, hypodermoclyses of glucose solution, enemas, and magnesium sulfate catharsis. After alcoholic intoxication was maintained for twenty-four to seventy-two hours, the patient was usually able to tolerate a liquid and later a soft diet without vomiting, and to leave the hospital within a week. Since Hardin's death in 1937, treatment has consisted solely of honey and brandy given if necessary by gavage, intravenous infusions, and emptying of the bowel as it is deemed necessary. Equally good results have been attained.

Prevention is, of course, the ultimate goal of all treatment, and the history of milk sickness indicates that elimination of the poisonous plants has led to the virtual disappearance of the disease. It persists in remote rural areas because of prejudice, ignorance, and indifference. Since these phenomena are not regional, it may be safely assumed that milk sickness will continue to occur sporadically. Fortunately the disease has not been known to occur in urban communities (where it would probably be undiagnosable), since commercial pooling of milk renders the toxin innocuous by dilution.

### *Summary*

Milk sickness is now a medical curiosity, although a century ago it was a formidable disease. The primary intoxication in cattle is caused by the ingestion of white snakeroot or rayless goldenrod, and is transmitted in milk to man. The disease is characterized by anorexia, weakness, fatigability, constipation, nausea, and pernicious vomiting in acute, relapsing, and probably chronic forms. The acute phase is marked by profound dehydration and acidosis, and a fatal termination is common. Fever and leukocytosis do not occur.

The toxic principle contained in white snakeroot and rayless goldenrod is a secondary alcohol called tremetol. The mode of action of tremetol is unknown. Treatment is nonspecific and is directed toward correction of dehydration and acidosis. Empirically, the use of intoxicating doses of alcohol apparently improves the prognosis. Convalescence is prolonged, and relapse often follows premature physical exertion.

Milk sickness has virtually disappeared as white snakeroot has been eliminated from the pasture land of the eastern United States.

## DIPHTHERITIC MYOCARDITIS

### *A Case Report*

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Winston-Salem

Myocarditis is a serious complication of diphtheria. Because of the decreasing incidence of diphtheria in the past few years, patients with diphtheritic myocarditis are seen only rarely. The case reported below illustrates many of the problems which arise in the diagnosis and treatment of this disease.

### *Report of Case*

E. H., a 13-year-old boy, was referred to the North Carolina Baptist Hospital on December 21, 1945, with the diagnosis of pharyngeal diphtheria. The history obtained was unsatisfactory, since he lived with a foster mother who knew little about him. As almost all North Carolina school children are immunized against diphtheria, he probably had received prophylaxis. His present illness began about six days prior to admission, with general malaise. Five days before admission the right side of his neck became "enormous." Two days later a right peritonsillar abscess was incised at the local hospital. He remained in that hospital for three days, during which time he received 240,000 units of penicillin. When a virulent diphtheria organism was obtained from the throat, he was given 25,000 units of diph-

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From the Department of Pediatrics of the Bowman Gray School of Medicine of Wake Forest College, and the Pediatric Service of the North Carolina Baptist Hospital, Winston-Salem, North Carolina.

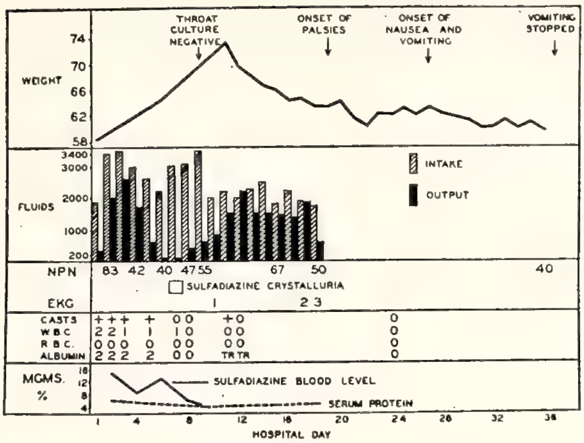

**Fig. 1**

theria antitoxin and was tranferred to this hospital for further care.

Physical examination on admission revealed a poorly nourished, moderately ill, white male in no acute distress. The rectal temperature was 99.2 F., the pulse rate 88, and the respiratory rate 20. The blood pressure was 110 systolic, 60 diastolic. The patient was dehydrated. The cervical glands were greatly enlarged and slightly tender. A necrotic membrane covered the right tonsil and extended to the uvula; a smaller membrane was present on the left tonsil, and the entire pharynx was edematous. The palate moved poorly, and the patient was hoarse; this hoarseness was felt to be a result of local edema. The heart was not enlarged to percussion; the rate was regular and no murmurs were heard. The liver and spleen were not palpable. The neurologic examination was within normal limits.

Laboratory examinations made on admission showed the hemoglobin to be 13.7 Gm., the red blood cell count 5,040,000, and the white blood cell count 13,800, with 84 per cent polymorphonuclear leukocytes. The urinalysis showed a 2 plus reaction for albumin; the specific gravity was 1.024. The centrifuged sediment contained a moderate number of granular casts, many white blood cells, and rare red blood cells. Throat cultures showed a moderate number of beta hemolytic streptococci, and numerous colonies of Corynebacterium diphtheriae, which gave a positive guinea pig virulence test. No attempt was made to establish the type of the organism. The remainder of the laboratory data are presented on the graph (fig. 1).

No further antitoxin was given, since it was thought that the patient had received an adequate amount prior to admission. Sulfadiazine and penicillin were given for the streptococcal infection. Large amounts of parenteral fluids were administered to combat the dehydration.

The initial azotemia, which was felt to be caused by dehydration, was relieved by the administration of fluids. A second episode of azotemia following renal complications of sulfadiazine therapy was treated successfully by stopping the sulfadiazine and by giving increased amounts of fluids and alkalies.

Cardiac involvement was not suspected until the sixth day after admission. Physical examination on that day showed no clinical signs of cardiac insufficiency. The pulse rate was 100 and regular. The heart was not enlarged to percussion; the sounds were normal, and there were no murmurs. The blood pressure was 100 systolic, 60 diastolic. An electrocardiogram was obtained because it was felt that early cardiac failure might be a factor in the patient's oliguria. The first electrocardiogram (fig. 2) showed low voltage in the limb leads, a PR interval

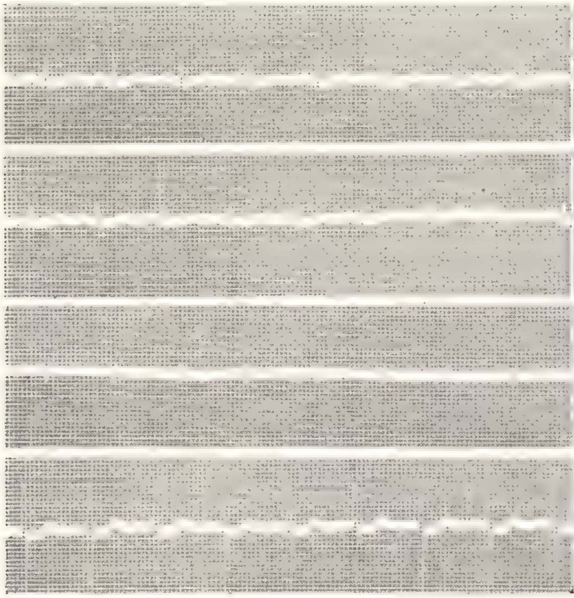

**Fig. 2. December 31, 1945. Normal sino-auricular rhythm. Rate 100. Low voltage in limb leads. PR interval 0.16 seconds. QRS time 0.05 seconds. T waves in all leads small but upright. Lead C F IV normal save for 1 mm. depression of S-T segment.**

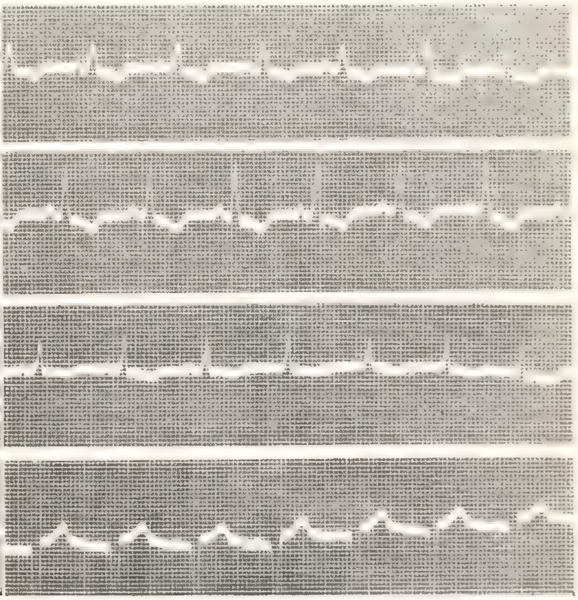

**Fig. 3. January 8, 1946. Comparison with figure 2 shows extreme changes. Rate 80. Delayed interventricular conduction is evident (QRS time 0.10 seconds), and the T waves in the limb leads are inverted. $S\text{-}T_4$ is elevated 1.5 mm., and there is no positive $R_4$ deflection. The PR interval is unchanged—0.16 seconds. The patterns are not unlike atypical bundle-branch block and are consistent with an acute process in the myocardium.**

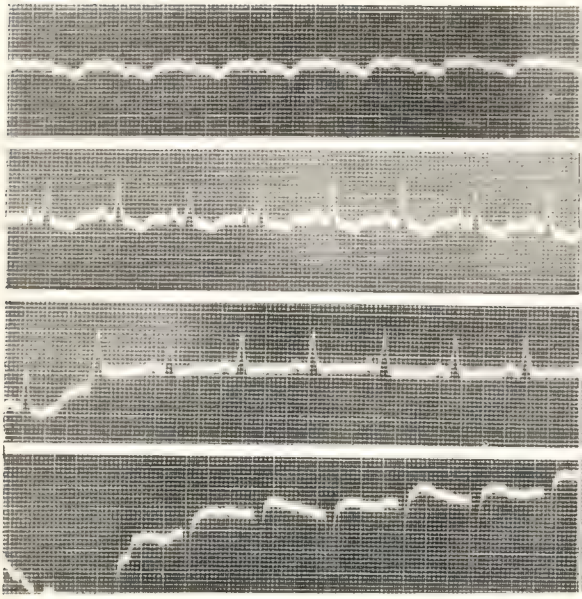

**Fig. 4. January 10, 1946. This electrocardiogram, made forty-eight hours after fig. 3, shows further drastic changes. $QRS_1$ shows markedly lowered voltage; $S\text{-}T_1$ is depressed and there is cove-plane inversion of $T_1$. $T_3$ is now upright and $T_4$ is somewhat flattened. Positive $R_4$ deflection is still absent. These findings indicate a rapidly changing acute process in the myocardium.**

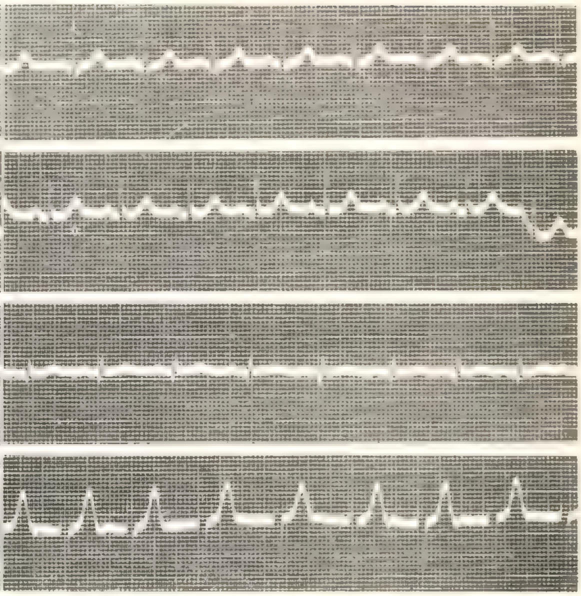

**Fig. 5. March 10, 1946. Ten weeks later the electrocardiogram is normal. The voltage is adequate; the T waves are upright and of good caliber; QRS time is 0.07 seconds, and the PR interval is unaltered—0.16 seconds.**

at the upper limits of normal, and a slight depression of the S-T segment in C F IV. The second electrocardiogram (fig. 3) showed a marked increase in the QRS time to 0.10 seconds, inversion of the T waves in the limb leads, elevation of $S\text{-}T_4$ to 1.5 mm., and absence of a positive $R_4$ deflection. Two days later there was marked lowering of the voltage in $QRS_1$, together with depression of $S\text{-}T_1$, coveplane inversion of $T_1$ and absence of a positive $R_4$ deflection. These changes disappeared gradually, and ten weeks later the electrocardiogram was entirely normal (fig. 5).

Questionably weak heart sounds were heard occasionally and moderate tachycardia was noted, but physical examination never revealed definite evidence of heart disease. Nausea and vomiting were troublesome from the twenty-seventh to the thirtieth day, and it was felt that this was a symptom of myocardial disease(1). During this patient's prolonged course no cardiac enlargement was demonstrated either by percussion or by teleroentgenogram. The blood pressure remained normal. The liver never became palpable or tender, and the cardiac rhythm and rate remained regular.

On admission it was felt that the local edema caused the hoarseness and the weak palatal movement. Improvement of these functions in the first few days of hospitalization substantiated this opinion. Twenty-two days after the onset of the illness, however, the patient again became hoarse. The gag reflex was not present, and fluids were regurgitated through his nose. This palatal paralysis persisted until the fifty-first day, from which time recovery was rapid.

The patient was seen seven weeks after discharge. During this interval he had gained 10 pounds in weight, and there was no edema. Physical examination revealed a normal 13-year-old boy. The Schick test was negative, and an electrocardiogram was normal. The patient was discharged to full activity.

## *The Frequency of Subclinical Diphtheritic Myocarditis*

The development of electrocardiographic evidence of myocardial involvement in diphtheria without physical signs of cardiac disease apparently is common. The fact that electrocardiograms are usually made only after the clinical findings point to cardiac trouble probably accounts for the relatively low percentage of cases of diphtheria in which myocarditis is diagnosed, and also explains the marked discrepancies in the incidences of cardiac involvement reported in various series. Many authors who have made routine electrocardiograms on all their patients with diphtheria have found that a significant number of patients showed electrocardiographic abnormalities without physical signs of myocardial disease(2), and a number of authors comment that there is probably more undiagnosed diphtheritic heart disease than that which is recognized.

## *Prognosis*

There is agreement that the prognosis is poorest in the presence of conduction defects.

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1. McMillan, R. L., Cowden, F. E., and Reinhart, J. B.: Gastrointestinal Symptoms of Progressive Myocardial Disease, Am. Heart J. 29:580-587 (May) 1945.

Andersen, however, noted that the patients who died earliest had the most marked physical signs and the least electrocardiographic changes(2b). Rostoski(3) believes that the early onset of myocarditis, even if it is manifested only by the electrocardiogram, implies a poor prognosis. Alstead, on the other hand, feels that the course is usually mild when electrocardiographic changes are present in the absence of physical findings(2a). Certainly there is abundant evidence that routine electrocardiograms should be made early in the course of diphtheria as a guide to the management of convalescence. Intravenous hypertonic glucose is probably the most effective form of therapy in diphtheritic heart disease, and prompt institution of treatment is probably of importance.

The prognostic significance of albuminuria is doubtful. Kuenzel(4) observed that the persistence of albuminuria beyond the eighth day was of serious import. Hoyne(5) pointed out the frequency with which albuminuria precedes the onset of clinical myocarditis, and considered it an unfavorable prognostic sign. Undoubtedly dehydration, with the accompanying renal dysfunction, may cause albuminuria.

Burkhardt and his coworkers(2h), Kuenzel(4), Place(2g), and Alstead(2a) commented on the high degree of correlation between the development of myocarditis and the appearance of paralysis. Togasaki and his associates, however, observed 278 patients with diphtheritic myocarditis, of whom only 8 had paralysis(6).

### *Treatment*

The treatment of diphtheritic myocarditis is unsatisfactory. Antitoxin should be given as early as possible, and in adequate amounts. There is agreement that intravenous hypertonic glucose can be of value in the treatment of diphtheritic myocarditis. This belief is substantiated by animal experiments(7). It is generally agreed that digitalis is a dangerous drug in diphtheria(2f,8). The extensive studies of Edmunds(7) on animals give additional confirmation of its potential toxicity in this disease.

### *Summary*

A case of diphtheritic myocarditis is reported, and the frequency of subclinical diphtheritic myocarditis is discussed. The importance of early recognition of myocardial involvement is stressed, since the prognosis may be altered by appropriate therapy in the acute phase and by prolonged convalescent care.

Dr. Robert L. McMillan of the Department of Medicine interpreted the electrocardiograms and gave advice in the management of the cardiac complications.

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2. (a) Alstead, S.: The Electrocardiogram in Diphtheria, Quart. J. Med. 1:277-288 (April) 1932; (b) Andersen, M. S.: Electrocardiographic Studies on Diphtheritic Myocarditis, Acta med. Scandinav. 84:253-312, 1934; (c) Natin, I. and da Rin, C.: Electrocardiographic Alterations in Diphtheria, Semana Med. 1:1789-1861 (June 14) 1934; (d) Shookhoff, C., and Taran, L. M.: Electrocardiographic Studies in Infectious Diseases: Diphtheria, Am. J. Dis. Child. 42:811-836 (Oct.) 1931; (e) Neubauer, C.: Diphtheric Heart-Disorders in Children, Brit. M. J. 2:91-94 (July 5) 1942; (e) Wesselhoeft, C.: Cardiovascular Disease in Diphtheria, New England J. Med. 223:57-66 (July 11) 1940; (g) Place, E. H.: The Heart in Diphtheria and Scarlet Fever, New England J. Med. 207:864-874 (Nov. 17) 1932; (h) Burkhardt, E. A., Eggleston, C., and Smith, L. W.: Electrocardiographic Changes and Peripheral Nerve Palsies in Toxic Diphtheria, Am. J. M. Sc. 195:301-313 (March) 1938.
3. Rostoski, O.: Heart in Diphtheria, Muenchen. med. Wchnschr. 85:434-440 (March 25) 1938.
4. Kuenzel, O.: Value of Albuminuria in Prognosis of Diphtheria, Deutsche med. Wchnschr. 65:328-330 (March 3) 1939.
5. Hoyne, A. L., and Welford, N. T.: Diphtheritic Myocarditis, J. Pediat. 5:642-653 (Nov.) 1934.
6. Togasaki, Y., Rosove, L., Bower, A. G., and Hamilton, P. M.: Treatment, Complications and Deaths in 753 Cases of Clinical Diphtheria, Am. J. M. Sc. 204:218-227 (Aug.) 1942.
7. Edmunds, C. W.: Circulatory Collapse in Diphtheria, Am. J. Dis. Child. 54:1066-1079 (Nov.) 1937.
8. McCulloch, H.: Administration of Digitalis into Children with Diphtheria, South. M. J. 14:110 (Feb.) 1921.

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# Maternal Welfare Section

## MATERNAL MORTALITY IN NORTH CAROLINA

FRANK R. LOCK, M.D.
WINSTON-SALEM

Obstetrics is an inevitable part of the practice of most physicians, and each general practitioner conducts about 50 deliveries a year, or approximately 2,000 during his medical experience. By the law of averages he sees the frequent complications of pregnancy often, but may never encounter other less common complications. The Maternal Welfare Committee has collected data from all the physicians in North Carolina who have managed an obstetric condition resulting in a maternal death. The collected information may benefit all who are interested in obstetrics, for by learning the facts associated with

Report of the Maternal Welfare Committee to the Medical Society of the State of North Carolina, read at the Second General Session, Virginia Beach, May 14, 1947. Members of the Maternal Welfare Committee are:

J. Street Brewer, M.D.
G. M. Cooper, M.D.
F. W. Franklin, M.D.
J. S. Hunt, M.D.
T. L. Lee, M.D.
Ivan Procter, M.D.
R. A. Ross, M.D.
R. A. White, M.D.
Frank R. Lock, M.D., Chairman

each death we may make an intelligent approach to correct the specific problems which now exist.

In December, 1945, the Maternal Welfare Committee was organized. At that time North Carolina was among the eight states in the nation with the highest maternal death rates. The object of the committee is to promote any method which will reduce the number of deaths associated with pregnancy.

One hundred and twenty-seven deaths have now been studied by the committee. A questionnaire has been sent to each physician who has signed a death certificate for a woman whose final illness was associated with pregnancy. Often additional questions are asked to obtain conclusive evidence of the cause of the patient's death and the method of management, since the committee must have full information in order to analyze the record accurately. A meeting of the committee is held whenever a sufficient number of complete records are on hand. The entire committee considers carefully each detail of the patient's last illness and of the treatment the patient received. No names are used in the presentation and discussion of the record, and the entire committee decides in an unprejudiced manner whether or not the death was preventable, and the factor responsible for those deaths which are preventable. The final report to the physician who signed the death certificate is outlined, and in each instance a report giving the conclusions of the committee and their reasons for them is sent to the physician.

## *Principal Causes of Maternal Deaths*

### *Toxemia*

Toxemias—hypertensive complications of pregnancy—have been the direct cause of death or a contributory factor in an astounding majority of the cases (table 1). In 93 instances the committee has had to consider this important problem as a factor in the patient's last illness and in the decision made in the management of the presenting problem.

**Table 1**

**Toxemia of Pregnancy**

| | | |
|---|---|---|
| Contributing to death | | 41 |
| Direct cause of death | | 52 |
| Convulsions: Before delivery | 16 | |
| After delivery | 14 | |
| Nephritis | 22 | |
| TOTAL | | 93 |

Twenty-two of the patients clearly demonstrated renal insufficiency complicated by pregnancy, with a definite record of hypertension and albuminuria in the early weeks of pregnancy. In some instances, they were properly advised to have the pregnancy interrupted, but refused. In others, the lack of adequate facilities for the care of the patient or an error in judgment, with inadequate appreciation of the danger to the patient, resulted directly in the loss of life.

Acute and fulminating pre-eclampsia followed by convulsions occurs in an appreciable group of patients in our state. Many physicians consider one examination during each month of pregnancy sufficient to fulfill the obligation of prenatal care. The fallacy of this concept is clearly demonstrated by the convulsive deaths of five women within two weeks after an examination at which no abnormality was found. In order to avoid these deaths, urinalyses and determinations of the weight and blood pressure should be made each week during the last month of pregnancy, and the patient should be educated to the danger related to signs and symptoms of toxemia. The observance and treatment of minor changes will almost always forestall the development of a serious toxemic condition.

Thirty patients had convulsions during their last illness. These preceded delivery in 16 cases, and in 14 followed a successful delivery. Not one of this group had the advantage of ideal prenatal care, and in only one instance was the death considered by the committee to be unpreventable. In some cases, however, the death was unavoidable with the available facilities and assistance. The principal error noted in the management of this problem was a false sense of security after delivery of the patient and inadequate treatment in the early puerperium.

On five occasions sudden death has followed the administration of a spinal anesthetic to a patient with toxemia. The committee is convinced that this anesthetic method is contraindicated in the presence of hypertension and pregnancy.

### *Hemorrhage*

Hemorrhage closely follows the toxemias of pregnancy as a cause of maternal deaths. In 75 cases it has been the direct or contributing cause of death (table 2). Postpartum

**Table 2**

**Hemorrhage**

| | | |
|---|---|---|
| Contributing to death | | 24 |
| Direct cause of death | | 51 |
| Postpartum hemorrhage | 31 | |
| Postabortion hemorrhage | 9 | |
| Ectopic pregnancy | 5 | |
| Placenta praevia | 5 | |
| Abruptio placentae | 1 | |
| TOTAL | | 75 |

hemorrhage has taken the greatest toll of lives. Thirty-one women have bled to death following their delivery, 9 after an abortion, and 5 as a result of ectopic pregnancy. In 24 patients the loss of blood has contributed seriously to the fatal outcome of an infection or other complication. Only 6 of these patients have received blood transfusions, and none have been given a quantity of blood sufficient to be expected to save the patient's life. Seven of the patients have died unattended by a physician. Delays in calling for assistance on the part of the family were responsible in 3 cases, but in 4, a precipitate labor was quickly followed by a profuse hemorrhage and death. The latter patients in rural areas were the victims of their environment and could have been saved only by proper assistance immediately available.

*Abortions*

Abortions represent a widespread menace in our state. Criminal interference with pregnancy cannot be proven in most instances, but it is strongly suggested in many records. Of the 24 deaths associated with abortion, 9 were due to hemorrhage, 11 to infection, and 4 to toxic drugs ingested in an attempt to produce an abortion (table 3).

**Table 3**

**Causes of Deaths Associated with Abortions**

| | |
|---|---|
| Infection | 11 |
| Hemorrhage | 9 |
| Poison | 4 |
| TOTAL | 24 |

Nine (45 per cent) of the patients were married, leaving other children motherless. Often the patient concealed her illness at home, and medical aid was not sought until she was moribund. This fact is shown by the predominance of abortions in the deaths from infection. The majority of the patients in the group received little or no treatment until the last forty-eight hours of life.

*Heart disease and anesthesia*

The two additional complications requiring our attention within the state are heart disease and anesthetic complications, which together took 21 lives. The records show that the cardiac lesion was not often recognized early, and that proper treatment was delayed or withheld through errors in diagnosis or management. Each of the commonly used anesthetic methods has been responsible for one or more deaths. Spinal anesthesia has been the principal offending agent, with sudden death following the injection on seven occasions.

*Factors Responsible for Preventable Deaths*

As a society we must be vitally interested in the factors responsible for our preventable maternal deaths (table 4). Eighty-two records have been fully classified by the committee. Sixty-six of the group were obstetric deaths, or deaths resulting directly from a complication of pregnancy. Sixty of these were preventable. Sixteen were classified as non-obstetric, since the cause was not directly related to pregnancy, although the death occurred because of the presence of pregnancy. Five of these were classified as preventable.

**Table 4**

| | |
|---|---|
| Preventable obstetric deaths | 60 |
| Non-preventable obstetric deaths | 6 |
| Preventable non-obstetric deaths | 11 |
| Non-preventable non-obstetric deaths | 5 |

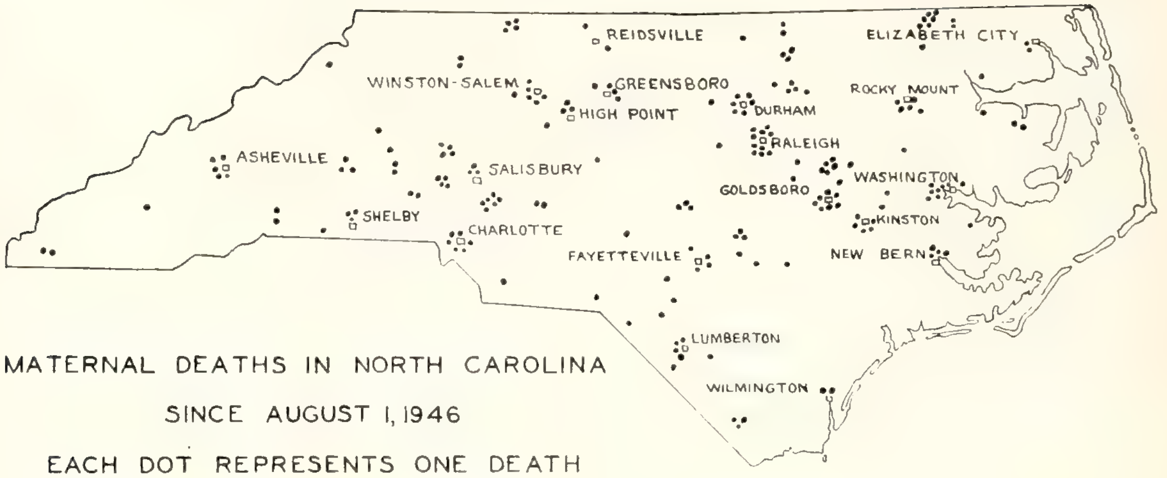
One or more of the three principal factors listed in table 5 was present in each of the preventable deaths. Ignorance or neglect on the part of the patient or her family (not seeking medical care or refusal to follow the correct advice when it was given) was the most frequent factor in the records. In 55 cases this problem was largely responsible for the patient's death. Errors in judgment or technique on the part of the physician were recorded on 48 cases by the committee. Lack of facilities to care for the patient has directly caused 11 deaths.

It is recognized that we have observed idealistic rules in our assignment of the responsible factor. Under ideal conditions peritonitis does not develop following a

**Table 5**

**Factors Responsible for Preventable Deaths**

| | |
|---|---|
| Neglect or ignorance of patient | 55 |
| Physician error | 48 |
| Lack of facilities | 11 |



MATERNAL DEATHS IN NORTH CAROLINA
SINCE AUGUST 1, 1946
EACH DOT REPRESENTS ONE DEATH

cesarean section or vaginal delivery. The advent of this complication is an indication of a break in aseptic technique; and although an error in sterilization of the instruments is at fault, it is the responsibility of the physician in charge of the patient. In other instances gross errors in management have contributed to the patient's death.

The need for more capable consultants is a paramount problem. In many areas it is impossible to obtain the consultation of a specialist, and often telephone or "curbstone" consultations have been used. In only 12 of the 72 records which gave full information relative to consultations was satisfactory consultation obtained during the patient's terminal illness (table 6). This problem and a lack of interest in exact assignment of the cause of death are emphasized by the filing of 22 death certificates on which the cause of the patient's death was given inaccurately.

Table 6
Consultation

| | |
|---|---|
| Adequate consultation | 12 |
| Unsatisfactory or none | 60 |

### *Summary and Conclusions*

It is too early in the course of the work of the Maternal Welfare Committee to draw sweeping conclusions about the general problems which exist in North Carolina. Several limited conclusions are obvious, however.

1. Widespread ignorance exists among the laity. A broad educational campaign must be launched to avoid unnecessary deaths which result from the patient's failure to seek medical aid.

2. Standard practices in the management of obstetric complications must be widely encouraged by all members of our profession, and the rules of conservatism must be closely adhered to.

3. Available consultants are urgently needed in many areas.

4. Blood banks or other measures to facilitate the administration of whole blood are essential to safe obstetric practice and must be made available.

5. A careful general examination of each patient, including an examination of the heart and lungs, must be made to avoid unnecessary deaths after anesthesia and minor operative procedures incidental to obstetric problems.

6. Ten deaths directly due to anesthesia re-emphasize the danger of all anesthetic agents. Careful preparation of the patient and skillful administration, with all safeguards necessary to protect the patient, are required to make anesthetization a safe procedure.

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**Prevention versus cure.**—For a very long time we have accepted the old adage, "Prevention is better than cure." In our new era the belief in it—for of its truth there can be no doubt—must be made ever more manifest in our research and its directives and in our teaching. The most conspicuous interest of the student ten or twenty years hence will, I hope, no longer be in the rare or difficult and too often incurable case, but in the common and more understandable and preventable disease. May the daily question on his lips become not "What is the treatment?", but "What are the causes?" and "If preventable, then why not prevented?"—John A. Ryle: Social Pathology and the New Era in Medicine, Bull. New York Acad. Med. 23:328 (June) 1947.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## VII

## CHARLES D. MEIGS AND HUGH LENOX HODGE

Medical history records that some men are remembered for their obstruction to the progress of medicine. Charles D. Meigs (1792-1869), an inspired teacher of obstetrics and gynecology in the Jefferson Medical College, Philadelphia, is a typical example. He stubbornly and intolerantly opposed the introduction of anesthesia into surgery and obstetric practice, the theory of contagion of puerperal infection, cesarean section, and celiotomy for ovarian and other pelvic neoplasms. Time has proven that these measures were momentous and enduring in significance.

In 1843, Oliver Wendell Holmes presented his essay on the "Contagiousness of Puerperal Fever" before the Boston Society of Medical Improvement. Immediately Professor Meigs and Professor Hugh L. Hodge of the University of Pennsylvania attacked Holmes's theory. Meigs, a fine orator, berated this "absurd theory" and invoked Providence, as the alternative of accident, to account for the "coincidences." Holmes's famous reply was, "There is a point of mental saturation, beyond which argument cannot be forced without breeding impatient, if not harsh feelings towards those who refuse to be convinced. If I have so far manifested neither, it is well to stop here, and leave the rest to those younger friends who may have more stomach for the dregs of a stale argument."

Charles D. Meigs should be remembered not only for his uncompromising opposition to great medical discoveries but also as an exponent of conservative obstetrics and as a contributor to the establishment of scientific obstetrics in America. He was a pioneer in the new era of obstetrics, even though he was proven to be completely wrong in so many instances. Medical progress is enhanced by vigorous opposition.

Hugh Lenox Hodge (1796-1873), professor of obstetrics at the University of Pennsylvania from 1835 to 1861, was a native of Philadelphia of Scottish descent. Like Meigs, he never failed to take issue with the authorities of his time whenever his personal observations and clinical experience were at

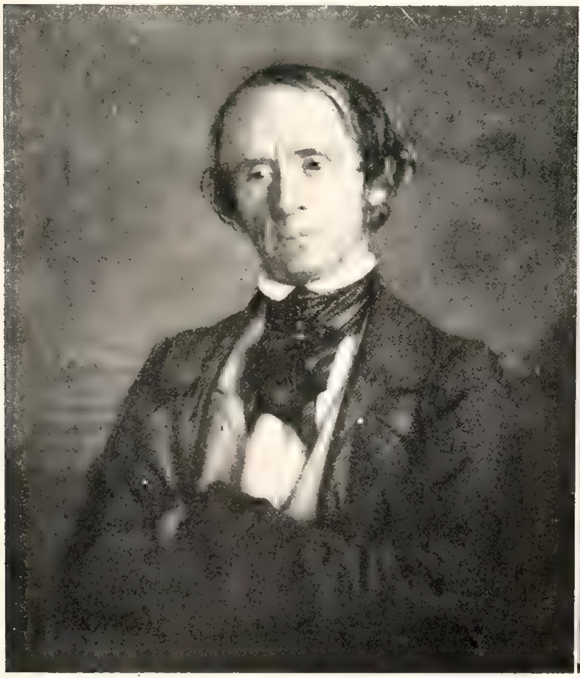

**Fig. 1. Charles D. Meigs, 1792-1869 (Reproduced through the courtesy of the Jefferson Medical College Library)**

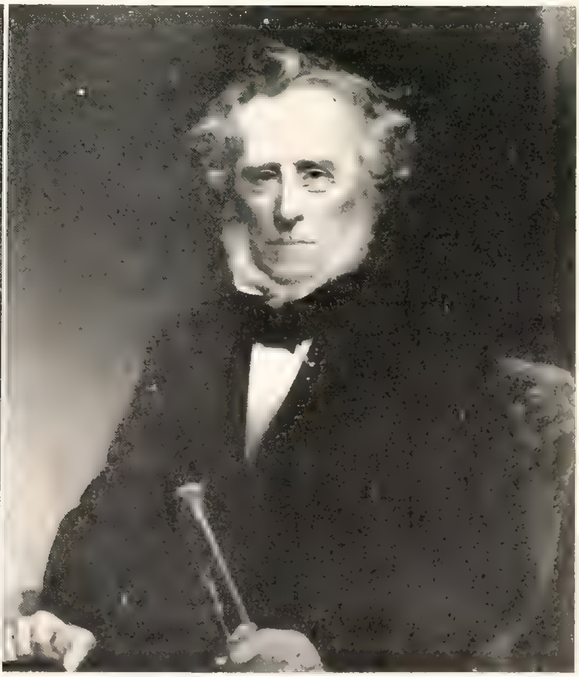

**Fig. 2. Hugh Lenox Hodge, 1796-1873 (Reproduced through the courtesy of the University of Pennsylvania School of Medicine Library)**

variance with their views.

Hodge was an excellent teacher and writer. Whitridge Williams considered his textbook, PRINCIPLES AND PRACTICE OF OBSTETRICS, published in 1864, as a masterpiece. Hodge also had considerable mechanical genius, and devised a placental forceps, long obstetric forceps, craniotomy scissors, and a pessary which is still popular. His pessary was constructed upon true mechanical principles—supporting the uterus by sustaining itself against the vaginal walls rather than against the rami of the pubis.

Hodge's later years were difficult because of failing vision. He was unable to read for the last twenty years of his life, and had to retire from teaching in 1863.

Hodge is recognized in obstetric history as a truly great man. He condemned symphysiotomy and held the middle road in regard to cesarean section. He advocated that all obstetric operations should be performed, as far as practicable, in accordance with the natural mode of delivery.

In 1871, the University of Pennsylvania bestowed upon him a high honor, the degree of Doctor of Laws. He richly deserved this tribute.

WALTER L. THOMAS, M.D.
Duke Hospital

* * * *

## WALTER CHANNING (1786-1876)

*Pioneer in Obstetric Anesthesia*

Walter Channing, M.D., who began the use of ether in obstetrics a few months after the first public demonstration of ether anesthesia at the Massachusetts General Hospital in 1846, was one of three talented brothers, sons of William Channing, a lawyer, of Newport, Rhode Island. One brother, Edward Tyrrell Channing, became a teacher of English at Harvard and exerted his influence on such pupils as Emerson, Holmes, Sumner and Lowell. The second brother, William Ellery Channing, was the leader of Unitarianism. Walter Channing, the "medical Channing" ("My brother preaches and I practice"), entered Harvard College in 1804 with his cousin, Richard Henry Dana. He took part in the "Rebellion of 1807," and thus failed to graduate with his class, although he received his degree in 1867. For his M.D. he went to the University of Pennsylvania. After graduation in 1809, Channing spent three years abroad, principally in Edinburgh and London, before returning to Boston in 1812 to practice obstetrics. Harvard welcomed back her erring son by conferring upon him an M.D. degree, and in 1815, only three years later, made him the first professor of obstetrics in the Harvard Medical School. He served his school for nearly forty years; for thirty of them he acted as dean.

Channing made three distinct contributions to medical thought. As early as 1819, when a young man, he studied cases of delirium tremens and strongly supported the view, not prevalent at that time, that sudden withdrawal of alcohol would not result in delirium. He made a "diligent inquiry on this point" in the Boston almshouse, and published his notes in the old *New England Journal of Medicine and Surgery* for January, 1819. In 1842 he recorded the first description of so-called hemolytic anemia of pregnancy. He considered transfusion as a method of treatment, but, fearing some unknown incompatibility, dared not try it. That the idea even occurred to him in 1842 discloses his scientific curiosity.

Channing was soon to find an outlet for his inquiring mind in etherization(1). Two cases of delivery under ether were reported in May, 1847. Later in the same year Channing had used ether six times, and by 1848, when his monograph, *Treatise on Etherization in Childbirth,* appeared he could report on its use in more than 500 cases. In a storm of controversy over the use of ether, or indeed any anesthetic in childbirth, Channing held a strong hand and played it with great skill.

A devout Unitarian, an ardent temperance reformer, a pacifist, he was a gay, vivacious and irresistible person, humorous and brilliant in conversation. For a pleasing insight into Channing as a traveler in Europe in 1852, with comments on puerperal fever and a discussion of the ether vs. chloroform controversy, any physician will enjoy his letters to a medical friend, published as *Professional Reminiscences of Foreign Travel.*

HENRY R. VIETS, M.D.
Boston, Mass.

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1. Channing, Walter: (a) A Case of Inhalation of Ether in Instrumental Labor, Boston M. & S. J. 36:313-318 (May 19) 1847 (Note: The delivery was performed on May 7); (b) Inhalation of Ether in a Case of Laborious Labor, Boston M. & S. J. 36:335-337 (May 26) 1847; (c) Two Cases of Inhalation of Ether in Instrumental Labor, privately printed, Boston, 1847 (Note: Contains the first two papers); (d) Inhalation of Ether, Boston M. & S. J. 36:366 (June 2) 1847; (e) Cases of Inhalation of Ether in Labor, Boston M. & S. J. 36:415-419 (June 24) 1847; (f) Six Cases of Inhalation of Ether in Labor, Boston, White & Potter, 1847 (Note: Contains the first three papers, with alterations and additions).

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JULY, 1947

## CENTENNIAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION

While the reckless use of superlatives is an American failing, it is safe to say that the meeting of the American Medical Association in Atlantic City, June 9-13, was the greatest medical meeting ever held in the world. The fact that 1947 marks the centennial anniversary of the founding of the American Medical Association was responsible for the unusual interest in this year's program. Atlantic City hotels and the huge auditorium which housed the exhibits and most of the section meetings were filled to capacity. Many doctors were unable to secure reservations.

For several days preceding the formal opening of the annual session, various special societies held meetings. On Sunday at 11 a.m. religious services were held in the Convention Hall. The speakers were Rev. Ralph Cooper Hutchison, Rabbi Joshua L. Liebman, and Monsignor Fulton J. Sheen. On Sunday afternoon the annual conference of state presidents and officers competed for attention with a conference of county society officers.

On Monday and Tuesday general scientific meetings were held in the ballroom of the Convention Hall, where advances in medicine and surgery were discussed by experts from this country and abroad. North Carolina was represented in the panel discussion on emergency surgery by Dr. Barnes Woodhall of Durham, whose subject was head injuries.

The high light of the opening session on Tuesday night was, of course, the address of Dr. Edward L. Bortz, delivered after he was installed as president of the American Medical Association. This address, which made a most favorable impression on his audience, was published in the *Journal of the American Medical Association* for June 14.

The House of Delegates was in session for four full days—from Monday to Thursday — with the exception of Wednesday morning. There was an enormous amount of work to be done, and progress was delayed by the large number of distinguished visitors who had to be introduced to the House, many of whom made addresses of varying length and intelligibility. Ordinarily the reports of the officers and of various special committees have been heard and most of the resolutions have been introduced before adjournment on Monday morning. This year, however, the House was exactly twenty-four hours behind schedule. It was Tuesday morning before resolutions were called for.

The most dramatic occurrence of the meeting came on Monday morning after Dr. Sensenich, chairman of the Board of Trustees, called for an executive session and read to it a long telegram from Senator Murray to President Harrison Shoulders. This message denounced the National Physicians

Committee for continuing its fight on compulsory health insurance, and abused the A.M.A. for not acceding to the demands of President Truman for a national health insurance act. The telegram was dated the day before it was delivered, and had been timed for release to the press immediately after it was read to the House of Delegates. Obviously the senator had planned the affair as propaganda for his latest version of the Wagner-Murray-Dingell bill. The trustees of the A.M.A. prepared for the press a dignified but scathing reply, which was unanimously approved by the House, and which gained more publicity than did Murray's blast.

In contrast to Murray's boorish message was President Truman's congratulatory telegram to the A.M.A., which was couched in elegant language, and was most cordial. This was read to the House of Delegates on Wednesday afternoon.

The most important committee to report was the one appointed more than a year before, on Amendments to the Constitution and By-Laws. Their revision, as amended since the December meeting of the House of Delegates, was presented, and a motion that it be acted upon at the next annual meeting was passed.

Notwithstanding the large number of members and guests present at this Centennial, the occasion was not complete without the genial presence of Olin West. It was the first meeting he had missed in so many years that it did not seem fitting to meet without him. President Edward Bortz paid him a graceful and well-deserved tribute in his presidential address, when he referred to him as "one of our nation's great medical statesmen . . . who for more than twenty-five years had been a loyal servant to the medical profession."

North Carolina was represented by one of its regular delegates, Dr. Charles Strosnider, and two alternates, Drs. Grady Dixon and Wingate Johnson. Dr. Strosnider was for the second time made a member of the important Reference Committee on Credentials, and Dr. Johnson was appointed chairman of the Reference Committee on General Practice.

## THE GENERAL PRACTITIONER HAS HIS INNINGS

The progress made within the past few years toward providing a more secure status for the general practitioner is really remarkable. When it became evident that the emphasis on specialization was endangering the supply of general practitioners, the leaders of organized medicine began to take steps to halt and, if possible, reverse the trend. The Section on General Practice, which had held trial sessions since 1943, was made a permanent member of the A.M.A. family in 1946. In Chicago last December the House of Delegates passed two resolutions for the general practitioner's benefit. One was intended to encourage the inclusion of general practitioners on the staffs of hospitals, and to discourage the requirement of certification as a requisite for membership on a hospital staff. The second resolution gave the green light to a certification board for general practice, to be set up under the auspices of the Section on General Practice.

In the Atlantic City session this year, the Council on Medical Education and Hospitals issued a supplementary report disclaiming any intent to close the staffs of hospitals to general practitioners, and urging that general practice sections be organized in hospital staffs. In his address to the House, President Harrison Shoulders stated that the most urgent need in medicine is increasing the number and availability of general practitioners, and recommended a special committee to study the distribution of medical care, especially in terms of the general practitioner. President-Elect Bortz recommended an additional session for the general practitioner in connection with the midwinter session of the House of Delegates. He also suggested that this midwinter session be rotated from one area of the United States to another, instead of being held in Chicago every year. The recommendations of both the retiring and the incoming presidents were unanimously adopted.

The committee appointed from the Section on General Practice to consider the advisability of setting up a specialty board for general practice decided that the establishment of such a board should be postponed for the present, at least. Instead, an organization to be known as the "American Academy of General Practice" was formed, with Dr. Paul Davis of Akron, Ohio, as its president. Dr. Davis was chairman of the Section on General Practice this year. The Academy of General Practice is to be a national organization, presumably analogous to the College of Physicians or the College of Surgeons. One commendable feature which is embodied in its by-laws provides that membership "shall terminate at the end of three years, and to be eligible for reelection . . . a member must have maintained his high moral and professional character, and must have spent a minimum of one month during his three-year period in postgraduate training of a nature acceptable to the membership committee."

The objects and purposes of the organization are given as follows:

1. **To promote and maintain high standards of the general practice of Medicine and Surgery;**
2. **To encourage and assist in providing post-graduate study for general Practitioners in Medicine and Surgery, and to encourage and assist practicing physicians and surgeons to participate in such training;**
3. **To encourage and assist young men and women to prepare, qualify and establish themselves in general practice;**
4. **To protect the right of the General Practitioner to engage in Medical and Surgical procedures for which he is qualified by training and experience;**
5. **To advance medical science and private and public health.**

Qualifications for membership are set forth in the by-laws:

> "To be eligible for general membership, the applicant must be a physician engaged in general practice. He must be of high moral and professional character. He must have graduated from a medical school approved by the American Medical Association. He must be duly licensed to practice in the state in which he practices, and must be a member of the local Medical Association of the area in which he practices. He must have had at least one year of rotating internship at an acceptable hospital or the equivalent in postgraduate training. He must have been engaged in the general practice of medicine for at least five years immediately preceding the date of his application for membership. He must have shown interest in continuing his medical advancement by engaging in some postgraduate educational activities during said five year period. Under unusual circumstances exception to the foregoing rules can be made by the unanimous vote of the membership committee. A general practitioner is defined as one who does not limit himself to one field of medicine."

It is to be hoped that this movement will not become in any sense a secession from the American Medical Association. Those who were most active in its formation say that it is not intended to be so interpreted, and cite the requirements of graduation from a school approved by the A.M.A., and of membership in the local medical society, as evidence that cooperation with the parent organization and not antagonism to it is the aim of the new group. They argue that the general practitioners are entitled to a society of their own, just as much as are the surgeons, the internists, the pediatricians, and other specialty groups. Certainly this argument seems valid, and the American Academy of General Practice should do much to supply the country with more and better family doctors. With this new national organization and with the newly envisioned midwinter session of the A.M.A.'s Section on General Practice, there is every reason for the general practitioner to feel that at last he is having his innings.

* * * *

## EDITORIAL NOTES

### A.M.A. Centennial

North Carolina was well represented at the centennial meeting, both in the section meetings and in the scientific exhibits. Among those presenting or discussing papers in the scientific sessions were Drs. Barnes Woodhall, W. C. Davison, Wallace Kernodle, Grant Taylor, Keith Grimson, and Eugene Stead of the Duke University School of Medicine; Drs. Hamilton McKay, Haynes Baird, and Kenneth Lynch, Jr., of Charlotte; and Drs. Weston M. Kelsey, George T. Harrell, Robert L. McMillan, and Charles R. Welfare of the Bowman Gray School of Medicine. In the scientific exhibits Drs. R. L. McMillan, J. P. Rousseau, J. C. Wiggins, Jr., and George Harrell represented the Bowman Gray School of Medicine, and Drs. Keith S. Grimson, G. J. Baylin, H. M. Taylor, F. H. Hesser, and R. W. Rundles, the Duke University School of Medicine.

The opening session on Tuesday night began with a musical program by the Philadelphia Festival Orchestra. As an encore, the orchestra played the "Iwo Jima March," composed by President-Elect Edward L. Bortz.

* * *

Dr. Guy Dain, chairman of the Council of the British Medical Association, brought "a birthday present" from the British Medical Association to the A.M.A. This was a gavel and block made of wood from the mulberry tree which grew in Charles Dickens' garden nearly a hundred years ago. The tree had to be taken down to make room for the British Medical Association House, which stands there now.

* * *

The weather during the first half of the week was delightful, but the last two days were torrid. The heat and the strain of four days' continuous session were beginning to tell on the delegates toward the last. Speaker Roy Fouts, however, kept his good humor throughout perhaps the most trying session the House ever held.

* * *

John Pratt and his associates of the Medical Services Foundation found that no entertainment had been arranged for the A.M.A.'s invited guests for Thursday. At noon Wednesday they secured a list of these guests and their wives, and arranged for a luncheon in their honor in the Belvedere Room of the Traymore Hotel at 12:30 on Thursday. An excellent program was hastily prepared, and handsome invitations were printed and delivered to "The Board of Trustees and Officers of the American Medical Association and their distinguished invited guests." This was an excellent public relations job. The Belvedere Room was filled to capacity, and our guests were quite favorably impressed by the affair.

* * *

The scientific exhibits were well worth all one's spare time. They often present in the most attractive form the concentrated essence of research extending over months or years.

## LOGORRHEA: A PUBLIC MENACE

Recently we have witnessed in this country a flare-up of a very old disease which has been endemic in all parts of the world from the beginning of recorded history. This disease appeared in aggravated form in Hitler and his associates; it has apparently long been prevalent in Russia, if we are to judge by the emissaries sent from that country to discuss so-called peace terms with her allies; but nowhere has it reached such virulence as in the United States Senate. Huey Long's case has long been the most famous example, but his was a sporadic form of the disease. In its last appearance it has been epidemic: Senators Morse and Taylor have been most seriously affected, but Senator Pepper and a few others have also been stricken.

The disease is a loathsome one, and one of its most offensive characteristics is that the real victims are not those who are afflicted with the disease, but those who are afflicted with the patient. Only the exhibitionist is susceptible.

The disease under discussion is logorrhea (from the Greek *logos*, "word," and *rheein*, "to flow"). Dorland's MEDICAL DICTIONARY defines logorrhea as "excessive or abnormal volubility"; Webster's definition is "excessive and often incoherent talkativeness."

Those old fashioned enough to have read Tennyson may recall that in "The Brook" he tells a poetic tale of a girl whose father's logorrhea drove her lover away day after day, until a friend made the supreme sacrifice of listening to the old man long enough to give the sweethearts time to make up their quarrel. This fictional hero at least had the satisfaction of knowing that he was suffering in a good cause. The unhappy colleagues of Messrs. Taylor, Morse, Pepper *et al.* did not have such a reward for the torture they endured.

While the victim of logorrhea is for the most part merely a public nuisance, he may upon occasion become a public menace. It is unfortunate that the archaic rules under which the Senate functions permit a mere handful of men with leather lungs, tireless tongues, and endless effrontery to thwart the obvious will of the overwhelming majority of their colleagues, and of the entire country. This is too close to government by minority to suit the temper of America.

# CASE REPORTS

## CLINICOPATHOLOGIC CONFERENCE

BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

### *Presentation of Case*

DR. FREDERICK R. TAYLOR: We are rightly told to consider common diseases before we do rare ones. As I read the protocol, I will try to discuss certain common things as they occur to my mind; if we can eliminate them, however, we must consider rare ones.

A 48-year-old automobile repair man entered the North Carolina Baptist Hospital January 15, 1947, and died just one week later. About a year before admission he began to note moderate generalized weakness and shortness of breath. Six months before admission a skin rash appeared overnight; it involved the whole body except the face, and was worst on the legs. The lesions first appeared as small, erythematous, pruritic papules, but later became pustular and crusted. Except on the legs they gradually improved with treatment, but there they ulcerated and crusted.

About two months before admission, the patient's local physician found his hemoglobin level 50 per cent. He was becoming weaker and more dyspneic. Parenteral liver and iron did no good. A few weeks before admission his hemoglobin was 39 per cent, his red cell count 1,830,000, the white cell count 7,300, hematocrit 17 (a practically normocytic anemia), color index 1.1, corrected sedimentation rate only very moderately elevated (12 mm. in an hour). Slight anisocytosis and poikilocytosis, and occasional basophilic stippling were noted. There was said to be no free hydrochloric acid in his stomach contents following histamine. Parenteral liver, iron, dilute hydrochloric acid, folic acid, and vitamin B all failed to benefit him.

The patient had had occasional epistaxis for many years, and during his present illness had it about every other day, sometimes severely. This could account for much of his anemia, but how can we account for the bleeding? We shall consider that point later. He had frequent mild frontal headaches during this illness. *Recently he had had increased postnasal drip;* he said this caused coughing, which was occasionally followed by nausea and vomiting. This postnasal drip may prove to be more than a mere incidental detail. The patient's wife said that his skin was yellow before the rash appeared. His soles felt "dead," as though he were walking on cushions.

Severe anemia with a slightly high color index, achlorhydria even with histamine, and paresthesias in the lower extremities make us think of pernicious anemia. Specific treatment for that disease failed, however, and a gastric analysis after admission showed plenty of free hydrochloric acid; therefore, we shall have to discard that diagnosis.

He had occasional colicky pain, and two loose, but not watery stools daily. Two months before admission his appetite failed, and after that he lost about 30 pounds. He had been in his present occupation for thirty years, and often had his hands in gasoline; only during the past year, however—that is, for about the duration of his symptoms—had the gasoline contained lead. It would be helpful to know how long before entering the hospital he stopped work.

The tetraethyl lead in gasoline is, of course, *organic* lead. This patient had a severe progressive anemia with some stippling of the red cells, but he lacked the other symptoms of tetraethyl lead poisoning, the outstanding and usually initial feature of which is maniacal excitement. There was no known exposure to inorganic lead other than the casual contacts with it that any automobile mechanic might have, working with batteries, and so forth. Furthermore, his colicky pains seem far too infrequent to suggest lead colic; there was no obstinate constipation or wrist drop; and the terminal clonic contractions of his arms were unlike the generalized convulsions of lead encephalopathy.

His father died of tuberculosis, and his mother probably died of the same disease during pregnancy.

The physical examination showed him to be well developed and well nourished, with pale skin and mucosa. A maculopapular eruption, complicated with bleeding scratch marks, was present over his arms, legs and body. His pupils and fundi were normal. The left nostril showed old blood. The thyroid, heart and lungs were not remarkable. His blood pressure was 140 systolic, 80 diastolic.

His liver was definitely enlarged (or pushed down), being three fingers' breadth below the costal margin. He had a reducible left inguinal hernia. His extremities were negative, except for the rash on the legs. The neurologic examination was essentially negative. No note is made of any objective disturbance of sensation in his soles. The rectal examination was negative.

The urine, which showed a very little albumin, a few white cells, and rare red cells, with no Bence-Jones protein, was hardly diagnostic of anything. There was a severe anemia, his hemoglobin being 7.3 Gm., and his red cell count 2,150,000. The hematocrit was 21 volumes per cent, which is again in keeping with a normocytic anemia. There were 1.8 per cent reticulocytes. This finding excludes the condition we call aplastic anemia, as there is no regeneration of red cells in it. The white cell and differential counts were normal except for 7 per cent eosinophils. As a number of skin conditions cause some eosinophilia, this may or may not be significant. The anisocytosis and poikilocytosis to be expected in an anemia were slight.

The serum albumin and globulin were not significantly disturbed. The Kahn test was negative, and the stool was negative for occult blood. This negative finding seems strange, for with all his nosebleeds, he must have swallowed a good deal of blood. The fasting stomach contents now showed 24 degrees of free hydrochloric acid and 50 of total.

X-rays of the skull, colon, and gallbladder were negative; a gastrointestinal series showed a deficiency pattern in the upper small bowel. I think this finding could well be attributed to his failure of appetite. *Fluoroscopy* of his chest was negative. It is unfortunate that there is no record of a film, since acute miliary tuberculosis may not show up on fluoroscopy.

While in the hospital, the patient developed furuncles of the thighs and legs. The sternal marrow showed slight hypoplasia of the erythrocytic series, again ruling out "aplastic" anemia. His temperature ranged between 98 and 101.2 F. Despite penicillin and a blood transfusion he became rapidly worse, and two days before his death complained of bilateral pain in his lower anterior chest on respiration. The next day a few moist rales were heard at the left base; a systolic murmur appeared at both the mitral and the aortic areas, and then he developed *clonic* contractions of his upper extremities. After the attack subsided, his blood pressure was 210 systolic, 110 diastolic, but soon fell to 150 systolic, 88 diastolic. I take this rise to be merely a transitory convulsive effect. Cheyne-Stokes respiration appeared the next day, and he died at 8:50 p.m.

### *Discussion*

DR. ELBERT A. MACMILLAN (Neurologist): Dr. Taylor has asked what significance may be attached to the "clonic contractions." The description given is not sufficient to make possible either an etiologic or an anatomic neurologic diagnosis. The presence of a rather marked hypertension following the attack would suggest that there was some increase in intracranial pressure associated with the seizure.

DR. GEORGE T. HARRELL (Internist): The blood studies on this patient indicate that blood was being regenerated, though the anemia was not being corrected. Such a hematologic picture could be due to chronic blood loss (though the nosebleeds were the only source described) or to hemolysis. Lead intoxication may cause hemolysis. Industrial lead intoxication(1) is most frequently acquired by the inhalation of dust containing lead compounds. Lead intoxication usually leads to the release of young erythrocytes which are polychromatophilic or contain basophilic stipplings. Gastrointestinal symptoms, with abdominal cramps, occur very frequently. The neurologic signs are usually peripheral (neuritis) rather than central (encephalitis). Alterations in kidney function, and hence in the urine, are produced by the renal lesions. Since lead is excreted in the urine, the diagnosis can be readily proven by quantitative determinations on twenty-four hour urine collections.

DR. TAYLOR: One diagnosis I think I can make with dead certainty, and that is a left inguinal hernia. Unfortunately, however, this is a side issue which has nothing to do with the patient's death; it is what Dr. Richard C. Cabot used to call an "anatomical landmark."

The patient's illness lasted too long to be due to an acute pyogenic infection from the

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1. Wampler, F. J.: Principles and Practice of Industrial Medicine. Baltimore, Williams and Wilkins Company, 1943, pp. 202-240.

start. The absence of chills and spiking temperature makes such a diagnosis even more unlikely. I have tried to exclude pernicious anemia, lead poisoning, and "aplastic anemia," whatever that is. The question of tuberculosis bothers me a bit. Could there have been some hidden focus that at the last exploded as an acute general miliary tuberculosis? This possibility seems unlikely to me, but I wish a chest film had been made. I see no evidence of an ordinary malignancy. I am no hematologist, but the differential count seems to exclude leukemia. Leukemia cutis may simulate many other conditions, but it is likely to involve the face; eventually the lesions become large, often coalescing and even producing a leonine facies almost suggestive of leprosy. Such characteristics are absent here.

Some common skin diseases, notably *scabies* and *pityriasis rosea,* spare the face. Since these are never fatal, however, and do not behave like this patient's rash, we may dismiss them even as coincident diseases. Apparently we are up against something unusual, without pathognomonic symptoms.

The rash does not resemble that of *mycosis fungoides,* with its tendency to develop ulcerating tumor masses. The eruption of *sarcoid* does not itch, and usually involves the face. Furthermore, this patient apparently had no lymph node involvement or deformity of the fingers, and no positive pulmonary findings. Since the cutaneous form of *periarteritis nodosa* usually shows hemorrhagic bullae sooner or later, I think it can be dismissed. *Disseminated lupus erythematosus* would almost certainly involve the face.

I believe we have a low-grade infection of some kind, perhaps affecting the bone marrow from the first, though with practically no effect on the white cells, later involving the skin, and finally the brain, with bilateral irritation of the motor centers controlling the upper extremities. It did not yield to penicillin. If we can rule out tuberculosis, I can think of no bacterial, viral, rickettsial, or protozoal disease that could produce such a picture. What, then, remains? Obviously, we must consider those mycoses which can become generalized. Here I am on admittedly unfamiliar ground.

*Blastomycosis* seems to be excluded by the lack of scarring and massive skin lesions. The nodules of *sporotrichosis* are absent, and the sudden appearance of the rash overnight seems to exclude that. In *coccidioidal granuloma,* and also in *toxoplasmosis,* when it becomes severe and generalized, we would expect more signs in the lungs than were found by physical examination or fluoroscopy.

*Torulosis* is to be considered seriously. It tends to affect the meninges and brain, and may affect the skin too. It often produces a "chronic meningitis." However, I can find nothing about nosebleeds or anemia in torulosis.

One fungus disease notoriously does affect the bone marrow, producing a severe progressive anemia, but having little effect on the white cells, except that eosinophilia may occur. That is *histoplasmosis.* A naso-oral type has been described, with single or multiple ulcerations in the nose or mouth, or both. This patient was subject to nosebleeds and complained toward the last of an increasing postnasal drip. This naso-oral type is often associated with cutaneous histoplasmosis.

My first guess is *histoplasmosis,* with *torulosis* as my second choice and some unusual type of *tuberculosis* as a very poor third. With any diagnosis whatever, I am unable to explain the fact that the rash spared the face, and the absence of pulmonary findings.

### *Anatomic Discussion*

DR. W. C. THOMAS: At postmortem examination, the basic pathologic findings were noted in the kidneys. These organs were markedly contracted and weighed 75 Gm. each. The capsules stripped with difficulty and the surfaces were coarsely and irregularly granular. The architecture of the cut surfaces was obscured by the scarring. The pelves presented no abnormalities. Studies of the microscopic sections revealed hyalinization of many glomeruli. Other glomeruli showed adhesions between the visceral and parietal layers of the Bowman's capsules, which showed evidence of old proliferative activity. The interstitial tissue was infiltrated by mononuclear cells and lymphocytes.

This case is of interest from several points of view. It portrays the slowly developing picture of uremia, the chief presenting symptom of which was itching of the skin. The question of the relationship of tetraethyl lead exposure and chronic glomerulonephritis can only be decided when complete clinical, experimental, and toxicologic information is available.

*Anatomic diagnoses*

*Chronic glomerulonephritis*

Uremia (excoriations of skin and clinical findings)

### *Closing Discussion*

Dr. William A. Wolff (Clinical Chemist): Dr. Taylor is quite correct in saying that we are up against something unusual, without pathognomonic symptoms. This is a rare disease—so rare that it has no generally accepted name, and so rare that it is almost unnoticed in medical literature. On seeing this type of patient, the clinician is startled and is very sceptical about the implication of his findings. The patient "feels well" and refuses to believe that he is suffering from a severe and fatal illness. There is almost nothing in the history or physical findings to suggest a serious pathologic process. The diagnosis is made *solely on laboratory findings.* The nonprotein nitrogen shows a marked elevation, sometimes 200 mg. per 100 cc. or more. The chlorides and total base are usually low. There is a marked acidosis, indicated by a low carbon dioxide combining power and a marked elevation of inorganic phosphates. A normocytic anemia, with red cell counts of 2,000,000-3,000,000, is usually found. The urine shows only a slight albuminuria, with occasional casts and a fixed low specific gravity. All the renal function tests show extensive impairment; the urea clearance is usually 10 to 20 per cent of normal.

We usually think of renal disease in terms of its complications—atherosclerosis, retinal changes, hypertension, cardiac insufficiency, edema, and gross albuminuria with hematuria. We fail to think of renal impairment apart from associated pathology. As a matter of fact, uncomplicated renal insufficiency is seldom seen by the physician. One of my associates at a large hospital in Philadelphia, in the course of twenty years, has seen between 30 and 40 cases of this type. In my own experience with blood chemical studies on some 200,000 hospital admissions, I have discovered 9 or 10 cases. I am confident that the incidence of uncomplicated renal insufficiency is much higher in the general population than these figures would indicate. The patient has no pain, "feels well," and therefore does not consult a physician or enter a hospital.

This type of renal insufficiency is the most interesting and the most neglected type of renal disease which I have encountered. An intensive study of this syndrome is well worth while.

Dr. David Cayer (Internist): Familiar diseases not uncommonly appear in altered guise. While we recognize that patients with chronic nephritis and renal failure may show marked gastrointestinal disturbances with nausea, vomiting and diarrhea, or anemias which fail to respond to usual forms of therapy, or even cutaneous changes secondary to uremia, the occurrence of these signs and symptoms without the other clinical evidences of hypertension, cardiac enlargement, eyeground changes, or urinary findings is most unusual.

It was somewhat unfair to Dr. Taylor to present him with this complicated problem and deliberately to omit the nonprotein nitrogen determination. We felt, however, that the omission of this laboratory finding would result in more discussion, and would show the case essentially as the diagnostic problem it presented to us. The diagnosis was suggested the day following the patient's hospital admission when he developed signs of air hunger, obvious acidosis, and increasing irritability suggestive of hypocalcemia and uremia. The additional laboratory data were then obtained and confirmed the clinical impression.

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## Norton Medical Award Invites Manuscripts

W. W. Norton & Company are again offering the Norton Medical Award for book manuscripts written for the lay public by professional workers in the field of medicine. Terms of the Award have been slightly altered. The publishers now set no final closing date for the submission of manuscripts, which may be submitted at any time, the Award not being limited to any one year. The Norton Award offers $5000 as a guaranteed advance against royalties. Either complete manuscripts or detailed table of contents, together with one hundred pages of manuscript, may be submitted. A descriptive folder giving full details of the terms of the Award may be secured on request from the publishers, W. W. Norton & Co. Inc., 101 Fifth Avenue, New York 3, N. Y.

Books that have previously won Norton Medical Awards are **The Doctor's Job** by Carl Binger, M.D., **Doctors East, Doctors West** by Edward H. Hume, M.D., and **A Surgeon's Domain** by Bertram M. Bernheim, M.D., published this spring.

# Psychosomatic Conference

## Duke University School of Medicine

### *Medical History and Findings*

Dr. H. King: A 26-year-old white single female was seen in consultation, at Dr. Magruder's request, regarding a history of tuberculosis. The patient, who had tuberculosis which had been arrested for some time, refused to believe that the disease was no longer active, and felt that she had a cavity in the left upper lobe.

The physical examination revealed a well developed, fairly well nourished white woman in no distress whatsoever. I could find nothing to suggest active tuberculosis. She had a rather profuse postnasal drip. The right chest was entirely clear, save for some compensatory over-aeration. The left chest demonstrated a definite respiratory lag. The left diaphragm was paralyzed from a permanent phrenic crush, and was elevated. Examination of the left lung revealed signs of a thickened pleura. There were also evidences of some contraction of the left lung, the mediastinum, trachea and heart being deviated to the left. The point of maximum impulse was felt in both the third and fourth interspaces; no significant murmurs were present. The peripheral vessels were clear. Examination of the abdomen was negative.

Fluoroscopic examination failed to demonstrate any signs of active tuberculosis. There was a definite shift of the mediastinum to the left. There was considerable calcium in the lungs, especially in the left upper lobe, and some fibrosis. The chest films showed numerous old scars, but no signs of fresh disease.
and the differential count was within normal

The patient's white cell count was 5,920, limits. Examinations of the sputum and gastric lavage revealed no acid-fast organisms. Serologic tests for syphilis were negative.

I talked with this patient for more than an hour, and explained fully the course of tuberculosis and the nature of her disease process at present. I do not feel, however, that she was yet willing to accept the fact that she has no active tuberculosis.

Her parting remarks were, "That may be, but something is causing my sore throat and vomiting. What is it?"

### *Psychiatric History and Findings*

Dr. William Magruder: This 26-year-old, white, single girl was first seen in the Duke Psychiatric Outpatient Clinic on November 30, 1944, at the request of the Wilkes County Welfare Department. They requested psychiatric aid because, although all recent studies showed that the patient's tuberculosis was arrested, she would not be convinced of this fact and insisted on staying in the Wilkes County Sanatorium. She was admitted to Meyer Ward, the psychiatric division of Duke Hospital, on January 30, 1945.

The patient is the oldest of six children. The mother, who is living at the age of 44, had a fifth-grade education. Her only physical complaint is progressive rheumatism. When interviewed, she seemed quite concerned over her daughter's welfare and believed she still had active tuberculosis. She was perturbed because the patient was in a psychiatric division, and was quite sure that eventually we would send her to another sanatorium. The father is 53. He owns a 70-acre farm which barely provides a subsistence for his large family. The patient has one sister, aged 23 and single, who works in a hosiery mill and provides the patient with the niceties of life. Her four brothers, whose ages range from 21 to 11, are all at home. Two of them help their father with the farm, and one is still in school. The fourth brother, aged 17, recently acquired a backache and just sits around all day; he has not sought medical aid. The mother says that her children never got much schooling because the teacher didn't help them or encourage them. They never got along well with the teachers, and her husband let them stop school.

The home consists of two rooms and is quite crowded. The family has always had only the bare necessities, and at times not those. The siblings have felt their poverty keenly. There have been many frank and open quarrels between the parents, and the mother has left the father for periods of a few days on various occasions.

The patient's birth and early development were normal, and there were no early neurotic traits. She began school at the age of 6 and completed high school without failing, and with fair grades. She got on well with her teachers and schoolmates, except that she was often called the teacher's pet. It was difficult for her to finish school, because she had few clothes and few books. She worked on the farm from an early age, doing menial work. She never complained or attempted to get out of any work. She had one remunerative job, which was working on Saturdays in a dry goods store. Just after graduation from high school, she went to live with an invalid aunt until the aunt died; shortly thereafter the patient was hospitalized.

The patient has had no heterosexual contacts. While in the sanatorium she met a young man who eventually asked her to marry him. Her reply was that if she got well, she would. She says, however, that she has no intention of marrying the man, but has just led him on. She corresponds with him freely.

In 1936 the patient began to lose weight and had blood-streaked sputum. In 1938 she had a massive hemoptysis and went to the hospital, where a diagnosis of tuberculosis, with cavitation in the left upper lobe, was made. After a few days in the local hospital, she was transferred to the Western North Carolina Sanatorium at Black Mountain. Pneumothorax was begun, but an effusion soon developed. She was kept on bed rest, and later in the same year a temporary phrenic crush was done. She remained in the Black Mountain Sanatorium for two years, and toward the end of that time was allowed to be up and was given work on the telephone switchboard. She stated that the work was too much, and that she had a complete recurrence of symptoms and massive hemoptysis. In her words, she was then sent to the fourth floor, "where they all die." In 1940 she was discharged to the "T.B. Hut" of Wilkes County. She remained there until her admission here in January.

According to the patient, the home was run by two laymen. The patients had to care for themselves or die. Rules were not enforced, and bed patients did not stay in bed. The patient said, "All of them died but me, and they sent me to Duke." Physicians seldom came to the "Hut," and sputum examination was rare. The patient described vividly the deaths of many of her friends; she was actually present during some of these deaths. Most important is the fact that nothing was done in the way of occupational therapy, and the patient said that she never heard a cheerful word during her sickness. Her parents came frequently, but they would stand in the corner and cry. She said that the doctor was cheerful in her presence, but that she would hear him discuss her and others outside the door, and always he would say, "Well, it's hopeless. They'll all die." In spite of the gloomy picture which is painted, the patient had a rather pleasurable existence. She acquired a radio and was provided with all the luxuries of a bed patient—bed jackets, housecoats, and many pairs of nice pajamas. She made many friends who have remained close, as is shown by her large correspondence.

When the patient was seen in the psychiatric outpatient clinic, the predominant picture was that of reactive depression; she cried a great deal. When first seen on Meyer Ward she was busy unpacking her belongings, which consisted of eight to ten pairs of pajamas, cosmetics, and various medicines. She insisted on getting into bed immediately. She kept a sputum cup, but produced only saliva. She complained of vomiting and of a sore throat which she thought was tuberculous. She remained in bed for approximately three days until her family could buy and send her clothes.

There was nothing very important in her mental status other than the mild paranoid trends. The patient was bitter toward every physician who ever treated her. Her intelligence was slightly below normal.

Daily interviews were held, which were unsatisfactory in regard to finding any psychodynamic factors, and which always ended in an attempt to convince her that her disease was inactive. She always replied, "Wait until I hemorrhage; you'll see." She attended occupational therapy classes in the morning and a special occupational therapy class in the afternoon. She was encouraged to take daily walks, and to go to campus movies, and to take part in other activities about the campus. She proved to be quite sociable, and was soon wrapped up in outside activities, although she declared that she was doing it at a risk. She was given small doses of insulin before each meal as an appetite stimulant. It worked well, and she made small gains in weight. Toward the end of her stay she became quite bitter toward me, probably because I was spending more time with another patient at that time. However, she has written two nice letters since.

She has an intelligence quotient of 82. A Minnesota Multiphasic Test was given, and the report showed that there is a possible lie factor and definite hysteria and depression factors. The paranoid quotient was also a little high.

The patient was discharged to her parents. I talked to her mother, who was by this time convinced that we were working on the right track. She has gotten along quite well at home and has taken steps to get into vocational rehabilitation offered by the state. She believes that her disease has been arrested and seems able to carry on a normal routine.

### *Discussion*

DR. E. E. MENEFEE: I think that in every patient who has tuberculosis there is a psychiatric factor. It frequently falls to my lot to break the news to a person that he has tuberculosis. Most such patients go into a very definite depressive state for a few days. I think this is normal. Fortunately, most of them soon adjust themselves quite well with the help of the doctor, who emphasizes that tuberculosis is a curable disease.

Tuberculosis carries euphoria with it. I was impressed by this fact while serving in New York, where I saw cases so far advanced that even a layman could see that the prognosis was hopeless. Even patients who were in oxygen tents would invariably talk about "next year, when they would be well." Very few realized they would be dead in a few weeks.

I am glad that Dr. Smith is here today. It seems that there are two schools of thought regarding therapy of tuberculosis. I came from a place representing one extreme, and Dr. Smith's work represents another extreme. The therapy used in the sanatorium where I worked consisted of intensive bed rest. The importance of this was impressed upon the patient. Dr. Smith worked in a place where the patients were encouraged to get up as soon as possible. I have thought about these two schools in the past several years, and I think both of them have certain advantages. In upper state New York, where the patients are encouraged to get up early, it is rare to see any depression in a patient. In New York City, where they are very strict about bed rest, the patients are more likely to become depressed. We don't know which method cures more patients. But we do know that we should not leave the patient in a state of depression when his tuberculosis is arrested, nor should we leave him with a phobia about his disease. I have seen convalescent patients who are absolutely afraid of doing anything and fearful of assuming any normal life.

In this particular case, I wonder if the patient would not have had the same emotional reaction to any infectious, communicable disease.

DR. D. T. SMITH: This thing we call euphoria is the result of a set of circumstances. Tuberculous patients are maintained in a good state of nutrition and are certainly well rested. They can produce lots of sputum and not suffer. There is no nausea or vomiting. There is no reason for them to be depressed. They can't visualize big holes in their lungs, because they feel very well. Under such circumstances, I think euphoria is a normal reaction. The percentage of patients with a pessimistic outlook is much larger in other diseases.

DR. MENEFEE: Uncomplicated pulmonary tuberculosis is painless.

DR. SMITH: I agree with everything Dr. Menefee has said. This problem of the patient's reaction to his disease is most important. No doctor is really successful in handling tuberculous patients unless he is a practical psychiatrist, a rule-of-thumb psychiatrist on the basis of experience. When the disease is first diagnosed, the patient falls into a black depression. He feels that the whole world is shut off to him; it is just like looking out of a window at a beautiful future and having someone draw the curtain down. The length of time the patient stays in that depression depends on the patient and how the doctor talks to him. Sometimes it lasts a week, and it is not abnormal for it to last several months. What the doctor tells the patient should depend upon his prediction of the patient's reaction. To a sensitive person he would say, "You have a tiny little spot, and it is just a matter of a short time in a sanatorium." On the other hand, he often has to deal with a patient who is very cooperative for forty-eight hours and then wants to go back to work. The doctor then has to "scare the living daylights" out of him to get him to rest at all. Only a patient who has had tuberculosis knows the meaning of rest in bed. It means relaxing on the bed, not just staying in bed.

In the case presented today, many unfortunate circumstances combined to produce the patient's reluctance to accept the fact that she was ready to begin normal activities again. At Black Mountain Sanatorium an effort was made to put her on the telephone switchboard. Ordinarily such encouragement is all that is necessary to make patients feel better. Unfortunately, she had hemoptysis, so that it became fixed in her mind that even light activity would cause hemorrhage and a relapse. To make matters worse, she was put with patients who were really dying. Then, when she finished her period in the sanatorium and her disease was arrested, there was no place for her to go.

Tuberculosis is characterized by a tendency to relapses. It is often the case that a person will have one or several relapses before he is cured. After a relapse, the patient is usually somewhat pessimistic about ever getting well.

The obvious thing to do for this patient is to rehabilitate her, to get her a job. She will get along all right as long as she has someone to consult. Usually a person such as this would consult a tuberculosis specialist. I see patients who have been well for ten years usually once a year.

You have accomplished a real miracle with this girl. She should have a job that would provide her with more luxuries than her disease did.

DR. M. H. GREENHILL: A great many tuberculous patients resist progress after getting out of the sanatorium, do they not?

DR. SMITH: Saranac is full of patients like that. If a man has compensation insurance, he never gets well if he is that kind of person. He describes symptoms, and symptoms cannot be x-rayed. Another type of patient, more often a woman than a man, just stays in Saranac Lake and spends the rest of her life there.

DR. MENEFEE: Thirty-five per cent of the population of Saranac Lake have tuberculosis. At Saranac Lake the whole place closes up from 12 to 3 p.m. When a tuberculous patient gets there he feels at home, for Saranac is run by and for people with tuberculosis. They do not let life interfere with tuberculosis, or tuberculosis interfere with life.

DR. H. DE JONG: May not the euphoria characteristic of tuberculosis be due to toxic elements acting on the brain?

DR. SMITH: This theory is well known, but has never been proved.

DR. GREENHILL: I will briefly summarize the conference in this way. When this patient came to Meyer Ward, some of us were rather alarmed by two symptoms which she showed—namely, the suspiciousness and the hypochondriacal trends. She would not listen to a doctor. For this reason we considered this case more of a psychiatric problem than is found in the average patient with tuberculosis. Everyone who handles tuberculous patients sees a whole range of reactions. We as psychiatrists are interested not only in the responses of the average patient, which have been pointed out by Dr. Menefee and Dr. Smith, but also in the wider emotional deviations. It may be helpful to think of these as reactions to chronic illness. The tuberculous patient reacts more or less like other patients with chronic illness. In certain cases in which the personality warps in response to chronic disease, I like to use the term *somatic compliance*. This means, in effect, that the personality completely complies to what goes on in the soma. The characteristics of somatic compliance include the following: (1) hypochondriacal tendencies, (2) aggressive paranoid trends, (3) exaggeration of pre-existing personality problems, (4) secondary gain, (5) extreme dependency reaction.

You will recognize that this patient has shown all of these characteristics. I imagine, from what I know about the history, that she has always been a dependent person. She was both her mother's and her teacher's pet, and always relied upon her mother for praise and recognition. She seems to have shown again and again the pattern of becoming hostile when she was thwarted from following out her dependent role. Aggressive behavior was used commonly in the inter-personal relationships within the home, and she adopted the same type of behavior when she could not follow out her desires. It seems that she has always tried to be a model child. She carried on through difficult, menial, and monotonous work under deprivation in her home because that pleased her mother; copied her invalid aunt after she had taken care of this aunt, because being model and dependent meant complete identification;

and, finally, became a tubercuolus type when once she had the disease, subscribing wholeheartedly to the behavior that other tuberculous patients typically show and to what was demanded by the sanatoria. When she was not allowed to be dependent at the County Tuberculosis "Hut," she became hostile, as she did here when she was firmly but kindly pushed out of her invalid role. Of course, she undoubtedly got some secondary gain out of having tuberculosis, for facilities in all the medical institutions to which she was admitted were better than those in her own home.

Treatment here was essentially not difficult, although it might have been if her aggression had not been received properly. The first step was to push her gradually, but firmly, out of her invalid role into activities. She reacted to this attempt with marked hostility, which she was allowed to ventilate but which was not returned to her. She was allowed to be temporarily dependent upon a psychiatrist who could conduct her action into constructive channels. Her lifelong pattern of conforming in the most model fashion possible to the person upon whom she was dependent or to the environment in which she lived made the course simpler, because she became a good psychiatric patient on her way to recovery.

Although we can truly generalize about the emotional reaction of the tuberculous patient, the degree of emotional deviation or somatic compliance often depends on the lifelong behavior pattern of the patient.

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**New Remedy for Motion Sickness**

A new prescription specialty called Companol for "motion sickness" was announced recently by Dr. Theodore G. Klumpp, president, Winthrop Chemical Company, Inc.

Dr. Klumpp declared that the new chemical compound was a further development of what was first used by the armed forces during the war and described it as "a logical preparation to combat sea, air, train and automobile sickness." The product has been stocked and thoroughly tried for clinical evaluation on major steamship and air lines. "More than 80 per cent of the motion sick travelers studied obtained relief," Dr. Klumpp said.

"It is a mixture of scopolomine, luminal and atrophine. Motion sickness results from excessive stimulation of the organ of balance located in the ear, in addition to apprehension, nervousness and fatigue incident to modern travel. Scopolomine and atrophine are known to produce the best clinical results in counteracting the physical effects of unaccustomed motion, while luminal, through its calming effect, allays the apprehension and excitement which contribute to sea and air sickness."

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.

RALEIGH

NARCOTICS: *Entrapment exists only when government agents induce or originate criminal intent of a defendant. Failure of druggist to fill prescription as written, and the fact that some prescriptions are not filled until after the arrest of the defendant are no defense against the charge of illegal dispensing of narcotic drugs.*

The defendant in this case, a practicing physician, was charged on several counts with illegal dispensing of opiates (morphine).

The records show that a government agent made several trips to the vicinity of the defendant doctor's office with a drug addict, a hired informer. The agent searched the informer before the visits, then gave him money and directed that he enter the doctor's office for the purpose of securing drugs. Each time the informer came out with a prescription for morphine and ephedrine, and usually the agent accompanied the addict to a drugstore, where the prescriptions were filled and the sale completed. Several prescriptions, however, were postdated and unfilled when the defendant was arrested. Upon his first visit the informer complained of asthmatic attacks, and the doctor made a physical examination at that time before ordering treatment; no subsequent examinations were made, however. It was not stated whether or not signs of asthma were present. It was brought out in the trial that the defendant failed to observe numerous hypodermic scars on the informer's arms. It was also in the records that the physician accused the informer of being an addict, but ordered the drug despite this fact. The doctor also cautioned the man not to have all the prescriptions filled by one druggist.

The defendant was found guilty in district court of the illegal sale of morphine, from which conviction he appealed to the circuit court of appeals. Among other exceptions the physician's lawyers alleged that illegal means were used in securing evidence (entrapment), that he was arrested before some of the prescriptions were filled, and that the druggist failed to furnish the combination of drugs ordered. Ephedrine was not included when the prescriptions were filled. As to the question of entrapment, the court stated that this exists only when government agents induce or originate criminal intent of a defendant, and that there is none when criminal intent is already present and the agents merely afford the opportunity for the commission of a crime. Regarding the failure of the informer to have the prescriptions filled before the arrest of the defendant, the justices were of the opinion that criminal intent existed at the time of writing the prescription, and that the overt act committed placed in motion the crime which was afterward consummated. The court held that the failure on the part of the druggist to include the ephedrine as ordered was immaterial, as the intention was to secure morphine, which was the drug legally prohibited. The conviction of the lower court was affirmed.

Physicians who feel that it is incumbent upon them to furnish professional care for those suffering from drug addiction should take advantage of special provisions authorized by the Narcotic Bureau. This matter should be attended to by the physician personally, and copies of all communications, as well as affadavits of other physicians, should be kept safely filed for future reference. In cases of this kind it seems to be the intent of the law to prohibit the sale and distribution of opiates to habitual users of drugs solely for the purpose of continuation and not for actual therapy and rehabilitation. There are no restrictions of course against prescribing opiates during the course of a physician's practice if a disease process exists which requires such medication. (V. 149 Fed. Reporter, Second series, p. 29, U.S. Circuit Court of Appeals, Second Circuit, May, 1945)

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**Whenever a considerable number of tuberculosis deaths** occur in the homes of the community, a serious source of tuberculosis infection exists and undermines other control measures. The general hospital has an important role in reducing this hazard. By expanding facilities for care of tuberculous patients, particularly for patients during the pre-sanatorium period, the latter institution will be able to utilize its facilities for all patients needing long term care, or palliative treatment. The general hospital can provide the diagnostic service and short term care required by the large number of persons in whom case-finding programs discover minimal tuberculosis. —Jacob Yerushalmy, M.D., Hospitals, Aug., 1946.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX July, 1947 No. 7

PHYSICIANS have long observed that tuberculosis attacks the upper lobes of the lung by preference. A physiological explanation for this fact has been advanced. This hypothesis, if accepted generally, would put the standard treatment for tuberculosis —bed rest—on a sound scientific foundation, and mark a significant advance in our knowledge of infection and therapy in tuberculosis.

### Apical Localization of Phthisis

No discussion of human tuberculosis and its management is complete or convincing unless it takes into account the fact that, in its inception and throughout much of its course, phthisis in adults is confined to the upper third of the lungs. Most members of white and many members of yellow racial groups are almost immune to tuberculosis except in this region. It is a remarkable fact that, even after the sputum and gastric washings contain bacilli consistently, pulmonary lesions for years may be limited to the upper third of the lungs.

Explanations of this curious predilection for the apex have been unsatisfactory. Those who have most consistently urged bed-rest for the treatment of phthisis seem unconcerned with the apical localization and its significance in the pathology and therapy of tuberculosis.

The relation of man's erect posture to the physiological functioning of the lung is usually ignored. Recently published data on blood pressures in the right ventricles of human hearts show that when a tall, long-chested individual is standing or sitting the pressure of the column of blood from the right ventricle to the apex of lungs is equal to or greater than the mean arterial pressure in the pulmonary arteries. Thus the flow of arterial blood will be greatly restricted or even absent at the apices of the lungs of most adults while they are in the erect posture. Nor at such times is tissue fluid or lymph produced by filtration in this area since it requires nearly 15 mm. Hg pressure to overcome the difference in osmotic pressure between the plasma and the pulmonary tissue fluid.

As a result of the decreased flow of blood addition of carbon dioxide to and removal of oxygen from alveoli in the apical region will be minimal. Tubercle bacilli reaching this tissue will be in an optimal atmosphere to support their metabolism although this is probably not an important factor in apical localization.

As long as the subject is sitting or standing, the pulmonary arteries can bring few antibodies to the apical region and removal of bacterial products by lymph, or dilution by diffusion into the blood will be almost nil. Only when the patient is recumbent will these tissues be protected against accumulation of toxic substances. Removal of bacteria to the lymph nodes will be suspended during most of the waking hours, as will the replacement of antibodies and of monocytes from the blood.

In view of these facts, it is not remarkable that active tuberculosis so regularly begins in this region, or that it shows a predilection for the tall, long-chested individual and the lively young people who get a minimum of sleep. Lack of rest is important in that it gives the bacilli the maximal number of hours of optimal growth conditions and the tissues the minimal number of hours when the neutralization and dilution of toxic products, and the supply of antibodies and blood-borne phagocytes are as adequate at the apices as elsewhere in the lungs.

The great frequency of silicotic lesions at the apex also may be due to the fact that dust particles reaching this region will be removed by phagocytes less rapidly, and the injurious substances will be diluted and removed more slowly than in other parts of the lung.

This explanation of apical susceptibility is borne out by the statistics on the relationship of pulmonary tuberculosis and heart disease. Where the pulmonary circulation is depleted, as in cases of pulmonic stenosis, the incidence of active tuberculosis is high. Where there is pronounced mitral stenosis and the pulmonary circulation is engorged, cases of pulmonary tuberculosis are a rarity. This is not a matter of academic interest only. If the explanation given above is correct, obviously the ideal treatment of the early apical lesion is complete recumbency for most of the 24 hours. Clinicians who insist on "complete bed-rest" should realize that propping the patient up in bed for more than half an hour at a time interferes with the correct postural management.

So long as bed-rest remains an empirical and nonspecific form of therapy, it will be difficult to enforce it on intelligent people who feel well. An understandable, physiological explanation will make their cooperation more certain. To every adult with an apical lesion the hazards of the erect posture and the value of recumbency should be stressed. However, complete bed-rest, with its attendant discomfort and higher cost of nursing care, may not be superior to many hours of recumbency with brief periods out of bed.

Prolonged bed-rest will be better borne if numerous and gradually lengthening periods of sitting up or strolling about can be alternated with recumbency. A consideration of the pathogenesis of the apical and subapical lesions suggests that this may be sound practice in patients not prostrated by disease.

**Apical Localization of Phthisis, William Dock, M.D., American Review of Tuberculosis, April, 1946.**

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### Postural Factors in Apical Tuberculosis

The theory that apical tuberculosis is due to postural ischemia accounts for its frequency in those young adults, studious or playful or both, who get little rest and are continuously erect 14 to 20 hours daily. If accepted, this theory also explains why bed-rest alone is effective in so many of these cases but of much less value in those with pulmonary basal lesions or tuberculosis of the kidney, epididymis or skin. When patients are propped up in bed to read, ischemia of the apex is not abolished. The effectiveness of bed-rest is thus greatly increased by outdoor exposure during the day, as the breezes and bright light discourage reading and promote appetite and sleep by stimulating the skin and tiring the eyes. Where patients are outdoors during the day they spend the maximal number of hours quiet and completely recumbent. However, it seems not impossible that brief intervals out of bed for meals and to facilitate nursing would not unfavorably affect the "cure" and make it less demoralizing and costly.

The new understanding of apical tuberculosis will make such therapy as complete recumbency easier for patients to accept. While awaiting specific antibiotics capable of controlling this disease, physicians will welcome a reasonable explanation for the pathogenesis of apical tuberculosis and for the therapeutic method which is still the main reliance in dealing with the commonest cause of prolonged disability and of death among young adults.

**Editorial, Journal of the American Medical Association, July 13, 1946.**

# BULLETIN BOARD

## MINUTES OF EXECUTIVE COMMITTEE MEETING

April 13, 1947

The Executive Committee of the Medical Society of the State of North Carolina met in the Hotel Sir Walter, Raleigh, North Carolina, on Sunday, April 13, 1947. The meeting immediately followed a meeting of all the committees of the Society and was called to order at 3:45 p.m. by President Coppridge, who presided.

The following members were present:

**Officers:**

Dr. William M. Coppridge, Durham, president
Dr. George Erick Bell, Wilson, first vice president
Dr. James B. Bullitt, Chapel Hill, second vice president
Dr. Roscoe D. McMillan, Red Springs, secretary-treasurer

**Councilors:**

Dr. Donald B. Koonce, Wilmington, Third District
Dr. M. D. Hill, Raleigh, Sixth District
Dr. D. M. McIntosh, Sr., Old Fort, Tenth District

**By proxy:**

Dr. Frank A. Sharpe, Greensboro, president-elect (Proxy voted by Dr. Coppridge)
Dr. John Cotten Tayloe, Washington, Councilor, Second District (Proxy voted by Dr. Bell)

Secretary McMillan stated that Dr. Rachel Davis, chairman of the Advisory Committee to the Auxiliary, had brought up several inquiries from the president of the Auxiliary. The first concerned the advisability of the Auxiliary's meeting at another time and place, in view of the shortage of hotel accommodations. After some discussion, Dr. Bell moved that the Executive Committee express the desire that the Auxiliary continue to meet with the Medical Society. This motion was seconded and carried.

Secretary McMillan said that the next suggestion from the Auxiliary was that the Society members pay their wives' dues to the Auxiliary at the same time they pay their own annual dues. A motion to ask the Auxiliary to continue collecting its own dues was seconded and carried.

The last suggestion from the Auxiliary concerned a memorial to Dr. Paul McCain. After considerable discussion, Dr. Hill moved that a committee, with power to act, be appointed to confer with the Auxiliary on this matter. President Coppridge appointed Dr. Koonce, Dr. Matheson, and Dr. McIntosh as members of this committee.

The report of Dr. Bell's committee to secure an executive secretary was then discussed. This committee recommended that the Society employ Mr. Edmund S. Swindell, Jr., as executive secretary, at a salary of $4,800 per annum and with an allowance for travel to be fixed by a committee consisting of the incoming president, the secretary of the Society, and the chairman of the Finance Committee. Following some discussion, Dr. Koonce moved the adoption of the report, with the recommendation to the future officers that the office of secretary always be held by a member of the Society. Dr. Bullitt added an amendment specifying that the medical secretary be the immediate superior of the executive secretary. The amended motion was seconded and unanimously carried.

President Coppridge appointed Dr. Deryl Hart to serve on the committee to judge scientific exhibits, in the place of Dr. Howard Bradshaw, who was unable to attend the meeting at Virginia Beach.

A motion to adjourn was seconded and carried.

## NEW HANOVER COUNTY MEDICAL SYMPOSIUM

A Medical Symposium will be held at Wrightsville Beach, N. C., August 22, 1947, under the sponsorship of the New Hanover County Medical Society. Speakers will be:

- Dr. Isaac A. Bigger, Professor of Surgery, Medical College of Virginia, Richmond.
- Dr. Hobart A. Reimann, Magee Professor of the Principles and Practice of Medicine, Jefferson Medical College, Philadelphia.
- Dr. John T. Williams, Assistant Professor of Gynecology, Harvard University, Boston.
- Dr. Carl H. Smith, Assistant Professor of Clinical Pediatrics, Cornell University, New York.
- Dr. Fred M. Hodges, Clinical Professor of Radiology, Medical College of Virginia, Richmond.

The meeting will last from 11:00 a.m. until 10:00 p.m., with intermissions for lunch, cocktails, and dinner. The entire program will be held at Lumina Pavilion. Headquarters and Registration Desk will be at the Ocean Terrace Hotel. A list of hotels and cottages appears below. Doctors who wish to attend the symposium but are unable to obtain accommodations should write the Housing Committee, Box 203, Wilmington, N. C.

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|---|---|---|
| Ocean Terrace Hotel | $3.00 and up, single | (European) |
| Kitty Cottage | 7.00 and up, single | (American) |
| Landis Cottage | 7.00 and up, single | (American) |
| Hanover Cottage | 6.00 and up, single | (American) |
| Ocean Inn | 6.50 and up, single | (American) |
| Atlantic Inn | 3.50 and up, single | (European) |

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

Resigning his position as instructor in the Duke University School of Medicine, Dr. E. G. Goodman returned to Wilmington to undertake the practice of internal medicine, allergy and hematology on July 1.

* * *

Three members of the Duke University School of Medicine faculty have been appointed as expert consultants to the Surgeon General of the War Department. Dr. J. Lamar Callaway, professor of dermatology and syphilology, serves as consultant in dermatology; Dr. Elbert L. Persons, assistant professor of medicine and director of student health for men, is consultant in medicine; and Dr. Barnes Woodhall, professor of neurosurgery, acts in the capacity of consultant in neurosurgery.

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**Promotions**

- Dr. L. D. Baker—Professor of orthopaedics
- Dr. J. L. Callaway—Professor of dermatology and syphilology
- Dr. Robert Graves—Professor of neurology
- Dr. Barnes Woodhall—Professor of neurosurgery
- Dr. Philip Handler—Associate professor of biochemistry
- Dr. J. S. Harris—Associate professor of pediatrics
- Dr. B. Black-Schaffer—Assistant professor of pathology
- Dr. D. G. Sharp—Assistant professor of biophysics in experimental surgery and biophysicist to Duke Hospital
- Dr. J. T. Cuttino—Associate in pathology
- Dr. Max Schiebel—Associate in surgery

**New appointments**

- Dr. George Margolis—Associate in pathology

## STATE BOARD OF MEDICAL EXAMINERS

The Board of Medical Examiners will hold a meeting on July 31, 1947, at the Atlantic Beach Hotel, Morehead City, for the purpose of interviewing candidates for licensure by endorsement of credentials.

## NEWS NOTES FROM THE STATE BOARD OF HEALTH

Deaths from all leading causes, except cancer and accidents, showed an appreciable decline during the first quarter of 1947, according to reports received by the Vital Statistics Division of the North Carolina State Board of Health. There was not a single death reported as the result of malaria, scarlet fever, or typhoid fever. Cancer fatalities numbered 635 during January, February, and March as compared with 623 during the corresponding period of 1946, while accidents of all kinds resulted in 592 fatalities, against 539 the first quarter of the previous year.

The most noteworthy feature of vital statistics reports compiled so far this year is the unprecedented increase in the number of births. During the three months for which figures have been recorded with the State Board of Health 28,892 babies were born in North Carolina, as compared with 21,299 during the first quarter of 1946—a year which broke all previous records up to that time, with 100,595 live births.

Deaths from all causes in North Carolina totaled 7,715 during January, February and March, this year, which was a decline of 233 under the total for the corresponding period of 1946.

## CATAWBA VALLEY MEDICAL SOCIETY

The Catawba Valley Medical Society met at Lake Sylvia on June 19. Speakers on the program were Dr. Robert F. Bell, Dr. Boyce Griggs, Dr. J. F. Reinhardt, Dr. L. A. Crowell, Jr., and Dr. A. M. Cornwell.

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. Thomas W. Baker of Charlotte was guest speaker at the June meeting of the Forsyth County Medical Society, held in Winston-Salem on June 10.

## HALIFAX COUNTY MEDICAL SOCIETY

A film on "Nutrition" was shown at the regular monthly meeting of the Halifax County Medical Society, held in Roanoke Rapids on June 13.

## ASHEVILLE GUIDANCE CLINIC

The Asheville Guidance Clinic will suspend activities for the summer. During this time patients should be referred to 3 Cumberland Circle, Asheville, telephone 5555-W.

## NEWS NOTES

The Legion of Merit has been awarded to Col. John D. Yeagley, M.C., A.U.S., Winston-Salem, for his service as assistant director and later as director, Health and Sanitation Division, Institute of Inter-American Affairs, from February, 1943 to November, 1945.

## SOUTHERN MEDICAL ASSOCIATION

Mr. H. L. Williams of Birmingham has joined the headquarters staff of the Southern Medical Association as assistant to the secretary-manager, Mr. C. P. Loranz.

## EYE, EAR, NOSE AND THROAT SEMINAR

### Correction

The announcement published last month concerning the Eye, Ear, Nose and Throat Seminar to be held at Hendersonville on September 15, 16, 17, and 18 erroneously stated that the first two days would be devoted to ophthalmology and the last two to otolaryngology. The sessions on otolaryngology will be held on September 15 and 16, and those on September 17 and 18 will be devoted to ophthalmology.

(BULLETIN BOARD CONTINUED ON PAGE 438)

# AUXILIARY

At the Virginia Beach Meeting of the Auxiliary the membership reached the all-time high of 1004 paid members. This does not include our honorary members—those women who have been members for twenty years or more. These valued members swell our ranks considerably more. Our increased membership gives us a boost for the new year and a real enthusiasm for the work ahead.

The Executive Board for the year 1947-48 is as follows:

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## PHYSICIAN WANTED

The community of Farmer in Randolph County is in need of a physician. This is a thriving, thickly populated community within ten miles of a modern, 100-bed hospital. Any doctor interested in locating here should communicate with Miss Hope Hubbard, Farmer, N. C.

# BOOK REVIEWS

**Osler's Principles and Practice of Medicine.** Edited by Henry A. Christian, A.M., M.D., LL.D., Sc.D., Hon. F.R.C.P. (Can.), F.A.C.P. Ed. 16. 1539 pages. New York: D. Appleton-Century Company, 1947.

Dr. Christian has brought to the writing of the sixteenth edition of the **Principles and Practice of Medicine** the same endowment that Sir William Osler brought to the writing of the first edition: unusual professional acumen sharpened by long clinical experience, and a lifetime of practice in imparting information to others. After more than fifty years, the latest edition of "Christian's Osler" remains the outstanding single-volume textbook of medicine by a single author. The reader is inevitably impressed by the author's wide range of medical knowledge, by his discriminating selection of salient points in the discussion of diseases, and by his clarity of description.

The sixteenth edition is a worthy successor to a long line of notable publications. It measures fully up to expectations.

**Progress in Gynecology.** Edited by Joe V. Meigs, M.D., Clinical Professor of Gynecology, Harvard Medical School; Chief of Vincent Memorial Hospital, the Gynecological Service of the Massachusetts General Hospital; and Somers H. Sturgis, M.D., Chief of the Vincent Memorial Hospital Laboratory; Assistant Surgeon, Massachusetts General Hospital. 552 pages. Price, $7.50. New York: Grune & Stratton, 1946.

The authors have collected authoritative papers on gynecologic subjects into a volume which permits anyone to bring himself up to date on the progress which has been made in the field of gynecology in recent years. More than fifty experts have prepared papers dealing with subjects representing their particular interest in reseach and clinical work. The book is divided into ten major divisions, with the following titles: Growth and Physiology, Diagnostic Methods, Functional Disorders, Interrelationship of Endocrine Glands, Sterility and Reproduction, Infections and Their Treatment, Benign Growths, Malignant Growths, Operative Technique, and Preoperative and Postoperative Care.

A few of the subject headings of note are "Congenital Abnormalities of the Female Reproductive Organs" by Emil Novak, "The Morphological and Endocrine Basis for Menstrual Bleeding" by J. E. Markee, "Transfusion with Particular Reference to the Rh Factor in Gynecology" by Louis K. Diamond, "Functional Excesses of Uterine Bleeding" by E. C. Hamblen, "Masculinization, Virilism, and Hirsutism" by J. P. Pratt, "Endometriosis" by Walter R. Holmes, "Pelvic Lymphadenectomy in the Treatment of Cervical Cancer" by Daniel G. Morton, and "Vaginal Hysterectomy" by A. D. Campbell.

A sufficient number of illustrations are included to clarify major points in the text.

This volume is carefully planned, and fulfills an important need of each of the special fields. The highly specialized material has been carefully handled, so that it is readily applicable to problems occurring in generalized and specialized practice. It can be recommended to medical men, surgeons, gynecologists, and medical students as a valuable addition to their library.

**Diseases of the Chest: With Emphasis on X-Ray Diagnosis.** By Eli H. Rubin, M.D., F.A.C.P., F.C.C.P., Attending Physician, Division of Pulmonary Diseases, Montefiore Hospital and Country Sanatorium, New York; Visiting Physician in Tuberculosis and Physician-in-charge, Chest Clinic, Morrisania City Hospital, New York. 685 pages, with 355 illustrations (24 plates in color). Price, $12.00. Philadelphia and London: W. B. Saunders Company, 1947.

The vast amount of material on diseases of the chest contained in this volume makes it an excellent reference book for the internist, surgeon, and chest clinician. For the radiologist it is invaluable because of the author's special emphasis on the roentgenologic findings in chest diseases.

The subject matter is presented in a logical and orderly manner. In the discussion of individual diseases, the pathology, physiology, clinical symptoms, physical findings, roentgenologic features, differential diagnosis, and accepted methods of treatment are thoroughly discussed and beautifully illustrated.

Accurate descriptions of the diseases are given, and the author's opinion of valuable therapeutic measures is outlined in the light of his own considerable experience. The many pertinent case reports and illustrations are well chosen. A complete bibliography is supplied for further reference on each disease. The book is printed on excellent paper with abundant illustrative material, beautifully reproduced.

The student, chest clinician, and roentgenologist will find this volume a ready source of accurate information to help solve the many difficult problems encountered in chest disease. Dr. Rubin and the publishers are to be congratulated on this splendid publication.

**A Textbook of Medicine.** Edited by Russell L. Cecil, A.B., M.D., Sc.D., Professor of Clinical Medicine, Cornell University Medical College; Consulting Physician, New York and Veterans' Hospitals; Visiting Physician, Bellevue Hospital, New York City. With assistance of Walsh McDermott, M.D., Associate Professor of Medicine, Cornell University Medical College. Associate Editor for Diseases of the Nervous System: Harold G. Wolff, M.D., Associate Professor of Neurology, Cornell University Medical College. 1730 pages, with 244 illustrations. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1947.

The fact that Cecil's textbook has reached its seventh revision since the first appeared only twenty years ago is proof of its popularity. The seventh edition retains the double-column format of the sixth, as well as other desirable features, such as the table of normal values for clinical examinations. Sixteen new subjects are discussed in this edition, and so much new material has been added that it contains 164 more pages than did the sixth edition.

With each successive edition, the wonder grows that the editor is able to round up articles from 162 contributors and see that each one is ready in time to meet the publisher's dead line. The feat was all the more remarkable this time because the task was begun in the midst of the war, when many of the authors were in service or working overtime at home. Nevertheless, the job has been well done, and the seventh edition is a worthy successor to its predecessors. Until the eighth edition comes out, it will probably be referred to more than any other medical book in existence.

**Radical Surgery in Advanced Abdominal Cancer.** By Alexander Brunschwig, M.D., Professor of Surgery, University of Chicago. 324 pages. Price, $7.50. Chicago: The University of Chicago Press, 1947.

This monograph gives a frank and detailed account of the personal experiences of the author in performing extensive operations for the extirpation of advanced abdominal cancer in 100 unselected patients. The nonsurgical contraindications to radical resection of abdominal cancer, and the supportive treatment for patients undergoing these operations are discussed. Separate chapters are then devoted to the operations performed for malignant processes arising primarily in the stomach, small and large intestines, pancreas, liver, extrahepatic bile ducts, adrenal glands, and pelvic viscera. These discussions necessarily deal extensively with the removal of other organs which were involved by the spread of the original malignant process.

All of the 100 cases reported in this monograph were well studied and well followed, and the operative mortality in the group was 34 per cent. Seventeen per cent of the entire number received no relief from the surgical operations performed, while 30 per cent did receive some palliation. The remaining group of 19 per cent represents those who survived for long periods following radical surgery. Of this group of 19 patients, 6 died of carcinoma after an average of thirty-three months, while 13 are still living and well, their average survival time being forty months.

In operating upon these patients, Dr. Brunschwig undertook these resections with a purposeful disregard of the ordinary concepts of operability in intra-abdominal cancer. For this reason, the book is thoroughly stimulating, for it will cause all thoughtful surgeons to pause and reconsider their present ideas of what is operable and what is inoperable in intra-abdominal malignancies. It is far beyond the scope of this brief review to discuss the factors which Dr. Brunschwig considered in determining whether or not a given lesion should be resected. Furthermore, it is irrelevant whether the reader agrees or disagrees with the author's lines of thought and procedure. The volume should be not only read but studied carefully by surgeons, for it introduces many new concepts and modifies others. All surgeons should take advantage of every available means to cure or relieve patients with cancer by surgical methods until that happy day arrives when we shall have biologic methods for the early detection and adequate control of this dread disease.

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**Textbook for Psychiatric Attendants.** By Laura W. Fitzsimmons. 325 pages. Price, $3.50. New York: The Macmillan Company, 1947.

One of the most difficult problems in psychiatric training has been that of finding an adequate textbook for attendants. The present volume fills a long-felt need in presenting in a simple but intelligent fashion the basic essentials for psychiatric attendants. It begins with a brief section on the history of psychiatry and then leads the reader into a discussion of psychiatric nursing, stressing the basic points which a beginner must know. A discussion of hospital routines, precautions, feeding and first aid is followed by a chapter on ward housekeeping and personal hygiene. Special therapies are described, and how-to-do-it routines are included in each instance. Nursing care for special disorders is outlined and simple treatment procedures are presented in step-by-step listings. Finally, a chapter on definitions and explanations is given to round out a volume which will certainly find widespread usage in every psychiatric institution.

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**Postgraduate Obstetrics.** By William F. Mengert, M.D., Professor and Chairman, Department of Obstetrics and Gynecology, Southwestern Medical College; Chairman, Obstetrics and Gynecology, Parkland Hospital, Dallas, Texas. 392 pages. Price, $5.00. New York: Paul B. Hoeber, Inc., 1947.

The cover calls this volume "a treasury of practical guidance for the family physician." Dr. Mengert points out in the preface that the physician in an average community delivers about eighteen hundred women at the annual rate of approximately fifty, and that he encounters relatively few of the severe complications of pregnancy. For this reason the space assigned a given subject is roughly in proportion to the frequency of its appearance. The methods of management and therapeutic measures suggested are based primarily upon the new routines of Parkland Hospital in Dallas and those of the clinics of the State University of Iowa, with which Dr. Mengert was previously associated.

The author has succeeded admirably in collecting and presenting a wealth of material in a clear and concise manner. A large, clear print and numerous subheadings make clinical application of the text easy for the general practitioner. Each of the major subjects is presented with a distinct paragraph on the etiology, clinical course and symptoms, diagnosis, and treatment. In addition, the management of the major complications is summarized in outline form in many chapters.

Some clinics would question the recommendation of as much as 5 or 6 minims of obstetric posterior pituitary extract for the medical induction of labor (page 167), and the use of the intrauterine douche for the control of puerperal hemorrhage.

An excellent index permits rapid reference to various clinical procedures. This book may be highly recommended for the general practitioner as well as for the medical student.

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**Office Endocrinology.** By Robert B. Greenblatt, M.D., C. M., Professor of Endocrinology, University of Georgia School of Medicine; Director, Sex Endocrine Clinic, University Hospital, Augusta, Georgia. Ed. 3. 306 pages, with 71 figures. Price, $4.75. Springfield, Illinois: Charles C. Thomas, Publisher, 1947.

The author has attempted to condense the available information on the endocrinology of the male and female generative systems into a concise and practical book. Little theoretical material is included; instead Dr. Greenblatt makes a direct approach to the clinical symptoms commonly encountered, devoting little space to the diagnosis or differential diagnosis of the pathologic lesion.

He is more enthusiastic than most endocrinologists in recommending the use of endocrine preparations in the management of abnormal uterine bleeding, dysmenorrhea, and amenorrhea. He is specific in his recommendations for treatment of the various problems, including the exact dosage and schedule of treatment he considers proper.

His generous recommendation of androgen therapy in the treatment of dysmenorrhea, the climacteric, and abnormal bleeding, and even in some cases of nocturia and loss of libido, is in contrast to the cautious administration of androgens usually followed in the special endocrine clinics.

The general practitioner will receive much specific instruction concerning the management of various genital endocrine problems in the male and female from a study of this book. He should be very careful, however, in his review of the contraindications and cautions which Dr. Greenblatt includes.

# BULLETIN BOARD

(CONTINUED FROM PAGE 435)

## BARUCH COMMITTEE ON PHYSICAL MEDICINE

Increased opportunities in rehabilitation for the 23,000,000 Americans disabled by accident, disease, maladjustment and war, were forecast in the annual report of the Baruch Committee on Physical Medicine issued recently. The advancements in physical medicine and rehabilitation in the period covered by the report were termed of real significance in medical history by the committee, composed of leading physicians and medical educators.

One of the most significant items in the report was the announcement that the Advisory Board of Medical Specialties has approved the establishment of an American Board of Physical Medicine which will qualify physicians as specialists in this field of medical practice. Such specialists will be known as "physiatrists," a designation which stems from the Greek words "physis," referring to physical phenomena or agents, and "iatreia," referring to a physician or healer. The term, which was recommended by the committee, has been adopted by the Council on Physical Medicine of the American Medical Association, the American Congress of Physical Medicine, and the Society of Physical Medicine.

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*Mrs. J. Bascom Thompson, Principal*

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## VETERANS ADMINISTRATION

At least 16,000,000 veterans will come out of World War II, according to the latest Veterans Administration estimate. VA said the potential veteran population will increase until the official termination of the war, which has not been declared yet.

By comparison, World War I produced 4,627,000 veterans; the Civil War, 1,849,000 Union Army veterans, and the Spanish-American War, 381,000 veterans. This makes a combined total of 6,857,000 for the three wars, or considerably less than one-half of the minimum estimated for World War II alone.

## UNITED STATES PUBLIC HEALTH SERVICE

Dr. R. R. Spencer has resigned as Chief of the National Cancer Institute of the U. S. Public Health Service. Dr. Leonard A. Scheele, formerly Assistant Chief of the Institute, succeeds Dr. Spencer.

Dr. A. C. Ivy has been appointed executive director of the National Cancer Advisory Council, succeeding Dr. George M. Smith, Professor Emeritus of Yale University, who resigned some months ago for reasons of health.

* * * *

**"The Hospital Act and Your Community,"** a booklet authorized last year by the Hospital Survey and Construction Act, tells in simple terms what the Act means. It should be especially valuable to any group or community that wants to build a hospital but does not know how it goes about getting federal aid for construction. Single copies are available free on request to the U. S. Public Health Service, Washington 25, D. C. Larger quantities may be purchased at 10 cents a copy or $7.50 per hundred from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

## AMERICAN HEART ASSOCIATION

Dr. Arlie R. Barnes, Chairman of the Board of Governors of the Mayo Clinic, Rochester, Minn., has been elected president of the American Heart Association for the 1947-48 term. Dr. Tinsley R. Harrison, Professor of Medicine, Southwestern Medical College, Dallas, Texas, has been named president-elect. Other officers include Dr. Carl J. Wiggers, Cleveland, Ohio, vice president; Samuel Harrell, Indianapolis, treasurer; and Dr. Harry E. Ungerleider, New York City, secretary. Mr. Harrell is the first non-physician to serve as an officer of the American Heart Association.

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*Fellow of the American Psychiatric Association*

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# THE DIAGNOSIS AND TREATMENT OF PERIPHERAL NERVE INJURIES

WARNER L. WELLS, M.D.

RALEIGH

Peripheral nerve surgery, as based on our present knowledge of anatomy, histology, physiology, and surgery, is relatively simple. There are, however, three major barriers that confront the surgeon faced with a nerve injury: (1) Neurologic diagnosis has become so complicated that the average doctor shies from it as a technique belonging in the realm of a specialist. (2) Attention has been focused for so long on the broken bone and the bleeding wound that the pathways mediating movement and sensation have been neglected. (3) The demands of hemorrhage and shock often eclipse the less dramatic demands of the injured nerve until the patient has made inventory and finds impairment of sensation or limitation of motion.

### *Diagnosis*

There are eight clinically important peripheral nerves: the median, ulnar, radial, musculocutaneous, axillary, and the common peroneal and posterior tibial components of the sciatic. Injury to any one of these nerves is characterized by definite motor or sensory disturbances, or both.

Loss of sensation in the index finger and inability to flex its distal joint and that of the thumb are sufficient evidence for a diagnosis of injury to the median nerve. Numbness of the little finger and inability to spread the fingers signify loss of ulnar function. A dropped wrist is pathognomonic of radial paralysis. Wasting and paralysis of the biceps bespeak injury to the musculocutaneous nerve, and inability to raise the arm from the side signifies interruption of the axillary nerve. The leg cannot be straightened at the knee or flexed at the hip when the femoral nerve is cut, and there is paralysis below the knee when the sciatic is severed. The tibial subserves plantar flexion and sensation over the sole of the foot, while the peroneal mediates the ability to dorsiflex the foot and carries sensation to the top of the foot. Trick movements and sensory overlap are occasionally confusing, but rarely lead to an incorrect diagnosis.

Also to be mentioned are the trophic disturbances that accompany nerve injuries. There is atrophy of all tissues in the region, from skin to bones and joints. The part may be dry and cool, or cool with excessive sweating. Pallor and cyanosis produce a mottled appearance. The skin becomes thin and glossy, and the hair is lost or unusually abundant. The digits are tapered, and the nails rounded and ridged. The affected muscles atrophy, and their opponents draw the limb into a deformity so characteristic that it can be called the hallmark for injury of the nerve involved.

The injury is localized by determining where the nerve enters the site of injury. Palpation may reveal a tender, bulbous neuroma. Gentle percussion along the course of the nerve is helpful in defining the injured segment, for tingling will course up the nerve from the point where its filaments have been interrupted (Tinel's sign(1)). Electrodiagnostic and skin resistance tests are

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Read before the Sixth District Medical Society, Raleigh, October 30, 1946.

1. Tinel, J.: Nerve Wounds: Symptomatology of Peripheral Nerve Lesions Caused by War Wounds, New York, William Wood & Co., 1917.

interesting and helpful, but are in general of more academic than practical importance.

### *Anatomic Basis for Treatment*

Anatomically, a nerve is composed of nerve bundles enclosed in a fibrous sheath—the epineurium. The bundles contain fibers or axones made up of axis cylinders encased in myelin, which in turn is surrounded by a delicate sheath — the neurilemma. It is through the axones that the nerve impulses are conducted. The axone is, therefore, the functional unit of a nerve. When cut, the axone cylinders and myelin distal to the cut degenerate, leaving the neurilemmas as hollow tubes (wallerian degeneration). Any regeneration must proceed from the site of injury downward.

If the nerve ends are approximated, the axones grow into the distal segment through the channels left in the neurilemmas. It is inconceivable that each axone will proceed along its previous channel, however accurate the rotation of the segments. The best that can be hoped is that enough motor fibers will reach motor end plates and enough sensory fibers will reach sensory receptors to restore function. This statement is not intended to minimize the necessity for using every device to insure the most accurate alignment and careful approximation, for any error in rotation will increase the number of sensory axones growing down motor pathways, and *vice versa.* One can see why mixed nerves recover less completely than relatively pure motor or sensory nerves. In any event, completely normal function is rarely restored, except after digital nerve suture, and the more specialized the function of the nerve the poorer the recovery.

### *Treatment*

A cut nerve *must be sutured.* When to suture requires judgment.

#### *Of the acute nerve injury*

Only in an acute injury where a nerve is involved is it necessary to make an immediate decision as to whether the nerve should be visually examined. The absence of motor or sensory power in the region supplied by a given peripheral nerve which may have suffered violence should immediately excite the interest of the surgeon. If the wound is clean, the nerve should be examined and given the same consideration that is accorded devitalized muscle, an injured vessel, or a severed tendon.

An infected wound, associated with nerve paralysis, should be explored only in so far as is necessary to effect careful excision of devitalized tissue and institute dependent drainage. If the nerve is seen to be severed, however, it should be approximated, even though hastily, as long as new tissue planes are not invaded in the process. Identification is thereby made easier if later reapproximation becomes necessary. Even in an infected field, regeneration may begin and progress.

Only massive hemorrhage, shock, or other conditions detrimental to the vital economy of the patient should otherwise preclude examination of a nerve suffering an acute injury.

A word of caution is offered. If the acutely paralyzed nerve is intact and otherwise shows no evidence of gross damage, it should be left alone. Its failure to function may be due to concussion and physiologic block, in which case, unless extrinsic scar later constricts it, function will return spontaneously. If the nerve is contused and damaged microscropically, softening, hemorrhagic injection, or edema may or may not be present as the only gross evidence of damage. This nerve, too, should be left alone. Regeneration usually occurs. If not, later exploration will reveal the extent of internal scarring, so that resection will insure the reapproximation of undamaged nerve bundles.

When the acutely injured nerve is uncovered and found to be severed, reapproximation should be effected after its ends are debrided. It should again be borne in mind that regeneration following the primary suture might fail if microscopic damage to the nerve or its blood supply exists beyond the level of debridement. Pollock and Davis(2) have stated with reason, however, that if primary suture is performed and "the wound remains clean and heals by primary intention, we have taken advantage of the best possible conditions under which end-to-end suture may be performed."

If the nerve deficit is too great to allow approximation, it should be left alone until clean healing and stabilization of the wound have occurred. It is my opinion that in such

2. Pollock, L. J., and Davis, L.: Peripheral Nerve Injuries, New York, Paul B. Hoeber, Inc., 1933.

a situation the nerve should be neither pulled taut by suture nor marked by passing sutures through its ends. Tension and resultant nerve injury lessen the length of available healthy nerve when secondary suture is undertaken.

*Of the old nerve injury*

Cases in which the wounds of entry and exit have healed and the area of bruise or contusion has subsided present another problem. Here, it is important to determine the degree of nerve injury. Is the lesion partial or total, incomplete or complete? What is the duration of the injury? This evaluation, based on the history and examination, leads to a question of paramount importance: Is the lesion static, or is it becoming better or worse? A static lesion suggests complete, unyielding interruption anatomically by severance, scar, or constriction. If the paralysis or sensory loss is lessening, this is evidence of spontaneous regeneration or release of physiologic block. Regression in the function of a nerve that previously showed signs of improvement suggests the progressive, cicatrizing effect of internal or external scar, or if the nerve lies near a previously fractured bone, the damaging effect of callus.

If the lesion is static, the time elapsed since injury and the degree of nerve involvement become deciding factors in the decision to operate. *An early partial lesion should be treated conservatively. One seen late should be treated radically.* As a rule, failure to show signs of recovery after three months constitutes an indication for operation, especially if the case has been followed by the same observer. It is impossible to distinguish between complete anatomic and complete physiologic interruption. It is to be conceded that even this period of delay is arbitrary and without rational basis. It is simply a deferred exploration. Stookey(3) summarizes the problem by stating: "Early exploration seems to me to offer a possible means of diminishing delay in recovery, and at the same time an opportunity to facilitate regeneration. To explore a nerve involves little danger to the patient, and may offer the tremendous advantage of hastening recovery." And again the same author speaks with effect: "In any nerve injury with the history of trauma sufficient to warrant the belief that the nerve may have been severed or embedded in scar or callus, etc., nerve exploration should be done as early as the condition of the wound will admit."

Regeneration in a nerve is manifested by improvement in vasomotor status, increase in the tone of the paralyzed muscles, decrease in deformity, change in response to electrical stimulation, and unmistakable evidence of recovery of voluntary movement and sensation. The rapidity and degree of recovery govern the surgeon's decision to explore the nerve or leave it alone. If recovery is rapid and continuous, operative intervention may be delayed from one examination to another. On the other hand, when deceleration or cessation of recovery is observed, the nerve should be explored. Neurolysis may hasten recovery and prevent later severe, irreversible scarring. "The rule should be radical nerve exploration, with conservative nerve operation."(3)

If, after injury to an extremity, the nerve is normal immediately following the injury but later shows signs of decreased or progressively impaired function, it is being compressed either by scar forming in the injured tissues or by callus if it is at a previous fracture site. In such a situation the patient should have the benefit of early exploration. Delay can only lead to intrinsic nerve damage that may later require neurorrhaphy.

At all times the extremity should be considered as a whole. One should remember that the arm is but a vehicle to support and provide range of motion for the prehensile organ of sense, the hand; and that the foot is a hinged platform adapted to the locomotor function of the leg. Skin, bone, muscles, tendons, blood vessels, and nerves are of equal importance, and all are dependent on one another. Treatment must be directed to provide the maximum efficiency of the limb in the function for which it is adapted. If this perspective is held, economy of time and effort can be practiced. A nerve will heal poorly or not at all in the presence of deficient nutrition, whether due to vascular damage *per se* or to the impairment of lymph or venous return by a constricting superficial scar. Not infrequently, in cases where the nerve has been blamed as the primary offender, release of scar tissue with graft-

3. Stookey, B.: Surgical and Mechanical Treatment of Peripheral Nerves; with a Chapter on Nerve Degeneration and Regeneration by G. Carl Huber, Philadelphia, W. B. Saunders 1922.

ing relieves a nutrition deficit and is attended by a gratifying return of function. If a tendon, bone, or skin graft is required at the same time that a nerve requires suture, both procedures can often be done at the same operation.

### *Technique of operation*

When the lesion is in a nerve of one of the upper extremities, the patient usually lies supine on the operating table, with an arm board provided to support the part. An ether frame is placed in such a manner that drapes can be placed to the shoulder girdle; for except in explorations of the lower forearm and hand, where experience dictates that a wide incision will not be necessary, the entire arm should be accessible to the operative field. Moreover, drapes must cover the entire patient, and movement of the shoulder, elbow, and wrist joints in a sterile field must be possible. The axilla, arm, and hand have been shaved, the nails trimmed and cleaned, and the cuticle manicured. The extremity is washed with soap, water, and ether before a standard germicide is applied. The hand is encased in a sterile glove and the arm enclosed in a sterile stockinet. Windows may be cut as needed, care being taken to underfold the edges to prevent lint from entering the wound. Such preparation of the extremity permits any necessary incision, complete range of motion, and freedom for examination on electrical stimulation of the nerve.

The lower extremity is prepared with the same purpose in mind—namely, accessibility of the entire nerve under consideration. Thus, the entire thigh, leg, and foot should be draped for operation on the peroneal or tibial nerve; the buttock should be included for a sciatic nerve operation, and the lower abdomen should be in the field for operations on the femoral nerve.

There are two fundamental rules to be followed with respect to the incision: (1) any scar of the skin and subcutaneous tissue should be excised as part of the planned incision, and (2) the incision should be delineated to conform to the course of the nerve, to provide for possible extension, and to avoid later contractures. A sense of plastic surgical judgment based on beforehand planning is required. Straight lines should be avoided; flexion creases must not be crossed transversely or in a straight line, and the linear course of blood vessels and lymphatics must be respected. Sharp dissection to explore the injured nerve is preferred to blunt or scissor dissection. The plane of dissection *should always* be in a direction parallel with the axis of the extremity, for all important vascular, nervous, muscular, and tendinous structures are disposed in a linear direction. The aid of an assistant holding the tissues under gentle tension in a plane perpendicular to the knife is invaluable.

It is not within the realm of this paper to discuss the detailed anatomic approaches for each nerve. These can be found in any standard anatomy text or atlas. I would, however, like to point out certain general principles useful in nerve surgery.

Before making the incision it is well to outline on the skin the full extent of any possible incision, together with the scar to be excised. (As one gains experience, he will find that small windows will often suffice to provide needed exposure.) Cross-hatch marks facilitate accurate closure. The initial incision is made no larger than is necessary to resect the scar and provide adequate exposure of the damaged nerve; it can be extended more easily than an unnecessary wound can be closed. The close proximity of the nerve to principal vessels should keep one alert for arteriovenous fistula or false aneurysm. Frequently the blood vessels have been damaged by the original injury, so every effort must be made to protect their collaterals. Unless the operator is certain of his approach, it is safer to identify the nerve from normal tissue above and below the site of injury, for the nerve ends are often displaced by the disrupting force of the traumatic agent. Marking or rotation sutures are placed in the sheath of undisturbed nerve above and below the injury. When suture is made, these are aligned to facilitate correct rotation. Additional aids to correct alignment are the matching of bundles, of surface vessels and of any striations, and attention to cross-section contour.

The nerves should be handled gently at all times. Their blood supply comes not only from small vessels coursing longitudinally down the nerves, but from small vessels entering at intervals from the adjacent connective tissue. For this reason, one should avoid unnecessary freeing of the nerve. When long segments must be freed to obtain length, the segment freed really becomes an autogenous graft save for its meager intrinsic blood supply.

Unnecessary injury to the nerve can be avoided by handling it by its scarred ends. Rubber tapes cut from old gloves make excellent nerve retractors. Serial sections are made with a razor blade across each segment until crisp, bulging, unscarred fasciculi are encountered. The finest curved needle is then used to approximate the sheath only with sutures of no. 120 cotton, 00000 silk, or 005 tantalum wire. The nerve is then rolled gently between finger and tongue-blade to conceal any nerve bundles that tend to protrude. Sutures of 005 tantalum or small silver clips are attached to the nerve sheath 1 cm. above and below the anastomosis. X-ray examination postoperatively can then be employed to make sure that the suture line is intact. Tension or stay sutures should be avoided whenever possible; if they are necessary, they can usually be removed after the last sheath suture is placed. They are a source of obstruction at the suture line. One will find that the more experienced he becomes in nerve surgery, the less frequent is the need for tension sutures.

The chances for satisfactory recovery are enhanced by providing an unscarred bed for the nerve. Excision of contiguous scar is at times sufficient, or the interposition of a sheet of fascia may serve; occasionally, however, it is best to reroute the nerve through normal muscle or connective tissue. Tantalum foil or other foreign material is unnecessary.

Inability to obtain length has thwarted many efforts at nerve suture. The easiest and most readily available means of overcoming large defects is through the positioning of the joints. Flexion at the wrist and elbow, and flexion, adduction, and internal rotation at the shoulder provide length for the median and ulnar nerves. Save for wrist flexion, the same is true for the radial and musculocutaneous nerves. Sharp flexion at the hip will overcome defects in the femoral nerves. Gaps in the sciatic can be bridged by flexion at the knee and extension, abduction, and external rotation at the hip. The same procedure applies for the peroneal and tibial nerves, with the addition of plantar flexion for the latter.

If positioning alone does not suffice, the nerve can be carefully freed along its course in order to gain length. Specifically, the ulnar can be dissected out of its bed through the ulnar groove and transplanted to the antecubital fossa; the median, rerouted from its deep course to a more superficial position.

Where a nerve emits a branch to one of its muscles, that branch serves to anchor the nerve. If such a branch or branches are dissected back or stripped along the parent nerve, considerable length can be obtained. This technique is particularly applicable to defects of the median and ulnar nerves in the forearm or wrist, and for the posterior tibial at the ankle.

No easy formula can be fashioned for stating how large a defect can be overcome. Approximate examples, however, are as follows: median or ulnar at the wrist by flexion of the wrist alone, 1 to 3 cm.; ulnar in the forearm with positioning, stripping, and transplantation, 6 to 15 cm. (on one occasion I closed a gap of 18 cm. by this means); sciatic in mid-thigh with positioning and freeing of the nerve, 6 to 12 cm.; peroneal or tibial at the knee with flexion and freeing, 5 to 10 cm. Gaps up to 8 cm. can be bridged in the femoral by carrying the dissection well into the lumbar gutter and sharply flexing the thigh.

Necessary length is infrequently provided by resecting a portion of the clavicle in the case of a brachial plexus deficit, or by removing the head of the fibula where a hiatus in the peroneal cannot otherwise be bridged. Resection of a portion of the humerus to facilitate radial suture is extremely radical and rarely necessary. Rerouting of the nerve to the anterior surface of the humerus is far less traumatizing.

Experience with nerve grafts, either preserved or fresh, has not proved as salutary in human cases as animal experiments would indicate. Exception is taken to the use of autogenous grafts for digital nerve defects. Recovery is prompt and gratifying, as, indeed, it is following digital nerve suture. It is Bunnell's experience that, where graft of a large nerve is necessary, a three- or four-ply autogenous graft, taken from the sural nerve, offers the best chance for regeneration(4). The strands are small enough to be

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4. Bunnell, S.: Surgery of the Hand. Philadelphia, J. B. Lippincott Co., 1944.

nourished by the tissue fluids until they are invaded by a blood supply of their own.

End-to-end nerve transfers have a useful but limited application. Nerve junctures made by end-to-side implantation, by turning down nerve flaps, by suture at a distance with catgut strands, or by the interposition of a segment of blood vessel or formed clot have failed because they disregard the fundamental principle of nerve suture, the end-to-end union of axone bundles.

There are certain situations where any hope of nerve repair is impossible. Examples are: injury to nerve roots where they emerge from the spinal canal, certain lesions through the lumbar plexus or through the sciatic high in the notch, and wounds where terminal branches enter muscles, such as severance of the dorsal interosseous branches of the radial in the forearm. Tendon transfer or orthopedic corrective measures can salvage many of these cases. The most striking example of such a procedure is the transfer of flexor tendons to the extensors for wrist drop (radial paralysis).

The unsevered, scarred, partially paralyzed nerve poses the most difficult problem at the operating table. Here, the galvanic stimulator is of great value. Is the scar intrinsic, extrinsic, or both? Should existing function be sacrificed by severing the nerve, excising the scarred portion, and resuturing? If, after external neurolysis, the response to stimulation is improved, a further period of waiting may be justified. Other factors governing the decision are the color and texture of the nerve, the interval since injury, and the amount of recovery. A neuroma that replaces a part of the nerve should be removed and partial suture done. Longitudinal dissection of scar tissue is justified if one is careful to preserve the intervening nerve bundles that are normal. Internal neurolysis by the forcible injection of saline beneath the sheath is of questionable value.

### *Postoperative treatment*

Postoperatively, the limb is maintained in proper position with a plaster splint or cast. Sutures are removed on the seventh day, and on the ninth or tenth day the plaster support is exchanged for an appropriate brace. For the arm or leg this consists of a double leather cuirass, hinged at the elbow or knee. A buckle strap allows gradual extension over a period of several weeks. No definite time limit can be set, though unless the nerve defect was difficult to bridge, the suture line is usually safe after thirty days. It is always better to be cautious than hasty in this respect.

In difficult anastomoses of the brachial plexus or of the femoral or sciatic nerves the initial shoulder or hip spica cast is left undisturbed for thirty days.

Physiotherapy in the form of heat, massage, passive movement, exercise, manual training, and electrical stimulation is of inestimable value both pre- and post-operatively as a means of preventing or overcoming contracture, maintaining adequate nutrition, and hastening re-education. It is important to point out to the patient the necessity for continuing at home the professional physiotherapist's measures, which rarely consume more than an hour every day or two.

The patient should, moreover, be taught to guard against injury to the part. Trophic ulcers develop quickly in anaesthetic areas, and are indolent, deforming, and difficult to heal.

Corrective splints and braces are used to prevent or overcome contractures, to prevent overstretching of paralyzed muscles and their tendons, and to compensate for muscles lost through paralysis. Good examples are: the wrist-drop brace for paralysis of the radial nerve, the airplane splint for axillary paralysis, the foot-drop brace for peroneal, and the locking knee caliper for femoral paralysis. Other such appliances will seldom be needed if physiotherapy is diligently applied.

Recovery is manifested by a progressive descent of Tinel's sign. Sensation, motion, and trophic supply appear in that order. The protopathic sense recovers before the epicritic—that is, deep pain and awareness of heat and cold appear before appreciation of light touch and discriminative sense. Return of movement begins from above and progresses downward, through the successive levels of motor innervation. Thus, proximal muscles begin to function before the distal or intrinsic muscles, and the latter lag noticeably behind the former. Finally, color and warmth, normal sweating and skin texture appear.

So many factors influence the rate and degree of recovery that no clear rules can be formulated. If technique is poor, the resection inadequate, and postoperative tension excessive(5), regeneration will suffer. A nerve wounded by a high velocity bullet recovers less well than one cleanly cut. Repair of a nerve torn by stretch will have a poor end result, because the axones, like fibers in a broken rope, are pulled apart over a great distance, with resultant irreparable scarring. Young patients do better than the older ones. Associated vascular injuries limit the degree of recovery. Infection, though less a factor than formerly, will impair healing. Small nerves and unmixed nerves respond to suture more favorably than large nerves and mixed nerves.

In general, the radial, axillary, and musculocutaneous nerves have good function within a year after suture, the median and ulnar in eighteen months to two years, the femoral in twelve months, the sciatic in two to three years, the peroneal and tibial in eighteen months. Maximum recovery can be expected in three to five years, though recovery of motor function rarely progresses after three years. Except in cases of injury to the digital nerves, total restoration of normal function cannot be expected.

Space does not permit a discussion of causalgia, a not infrequent major complication of nerve injuries.

### *Conclusion*

If a cut nerve is relieved of its scar and carefully sutured without tension, or if the scarred or constricted nerve is freed of its bonds, recovery will occur within the limits of the individual in general and the limits of the nerve in particular, so long as contractures are prevented and nutrition is maintained by diligent physiotherapeutic measures.

5. Zachary, R. B., and Holmes, W.: Primary Suture of Nerves, Surg., Gynec. & Obst. 82:632-651 (June) 1946.

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**The importance of moral values in medicine.**—Any social order which neglects the importance of moral values must, in the long run, pay a sorry price. The quality of medicine which matters most is the preservation of high ethical standards and our acceptance of the responsibilities of freedom. Only to the degree that medicine keeps its own integrity can it ask or expect freedom.—Evan W. Thomas: The Increasing Complexities of Medical Care, New York Medicine 3:23 (June 5) 1947.

# Maternal Welfare Section

## TRANSFUSIONS IN RURAL AREAS

Mary I. Griffith, M.D.
Winston-Salem

Even under the best of circumstances, hemorrhage may be terrifying to an obstetrician. For most North Carolina physicians who are practicing obstetrics conditions are far from ideal, and one of the greatest handicaps is the lack of available blood for emergency transfusions. In some instances the nearest blood bank is more than one hundred miles away, and a patient with a sudden severe hemorrhage would bleed to death while *en route* to one of the larger medical centers where adequate transfusion facilities are available. The Maternal Welfare Committee, in its analysis of 75 deaths directly or indirectly attributable to hemorrhage, found that only 6 women had received blood transfusions.

It is obvious that physicians in rural areas and in small towns need some means of giving emergency transfusions. Several schemes which will make it possible to have blood readily available for this purpose now seem feasible. The factors involved are: (1) an adequate supply of donors, (2) proper facilities for preserving blood, and (3) expert technical assistance in typing and crossmatching and in keeping the necessary records. All of these requisites are within the scope of the usual 50- to 100-bed hospital; and where blood banks have been established, there has been no difficulty in maintaining them(1).

### *Donors*

In every blood bank, large or small, much effort must be exerted in order to provide an adequate number of donors. In some hospitals a donor is required for each patient

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*Prepared for the Maternal Welfare Committee of the Medical Society of the State of North Carolina.

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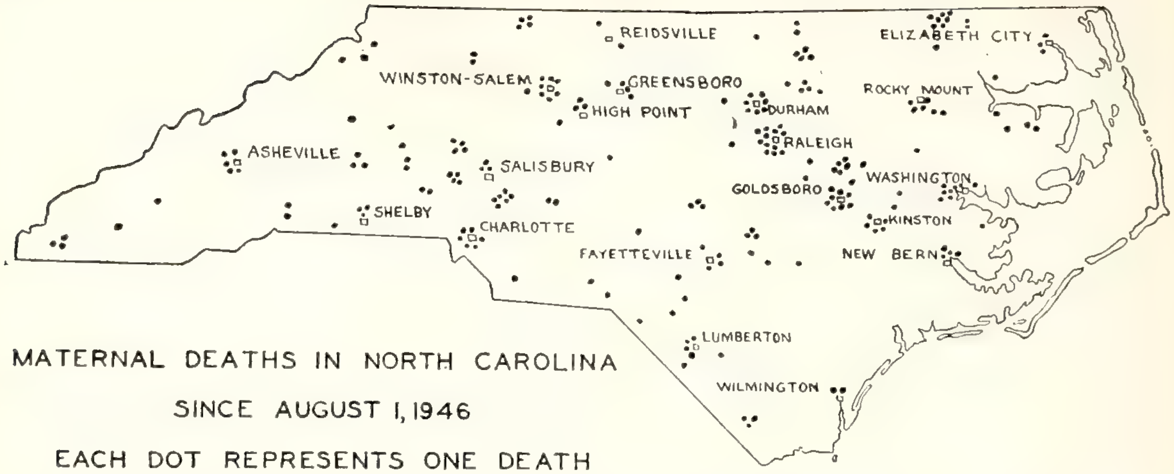
1. Blum, L. L.: The Present-Day Status of Combined Blood-Plasma Bank, with Reference to the Use of Concentrated Red Cell Suspensions, J. Indiana M. A. 36:187-193 (April) 1943.



MATERNAL DEATHS IN NORTH CAROLINA

SINCE AUGUST 1, 1946

EACH DOT REPRESENTS ONE DEATH

admitted; in others, two or three donors are required for every 500-cc. transfusion given. Sometimes volunteer donors in adequate numbers can be obtained by repeated appeals to church and civic organizations. If possible, such campaigns should be conducted in such a way that the number of donations is kept constant from week to week. This aim can be accomplished by conscription of pledges and by taking the blood by appointment.

Eagerness to keep up a good quota of donors should not blind the blood bank personnel to their responsibilities in the selection of healthy donors. Usually the age range should be 18 to 60 years. Obviously the use of an anemic donor is unfair both to him and to the recipient, and it is, therefore, good practice to do a hemoglobin determination prior to drawing off the blood. The temperature and blood pressure should likewise be determined, and the prospective donor should be questioned concerning transmissible diseases, especially syphilis, malaria, and infectious hepatitis. A serologic test for syphilis should always be made before donor blood is used, and, if possible, before the donor is bled.

### *Preservation of Blood*

There are several highly satisfactory types of commercially prepared sets for storing blood. These consist of sterile vacuum bottles containing an improved type of preservative which permits storage of blood for as long as three weeks(2).

The blood should be refrigerated at a temperature of 35-40 F. If it is allowed to freeze, the blood will be unsuitable for use because of hemolysis; and if it is allowed to become too warm, extremely toxic split proteins will be formed.

In those areas where proper refrigeration cannot be maintained, blood is best preserved by leaving it in the prospective donor. Under such circumstances it is helpful for physicians to have a list of available volunteer donors who may be called to the scene of an emergency when blood transfusion is indicated. Preferably such volunteers should be group O (universal donor), so that cross-matching may be omitted and the blood may thus be more quickly available. The use of group O blood without cross-matching is justified in an emergency, provided the typing is absolutely reliable. There are now available commercially prepared vials of so-called A and B substance which can be added to group O blood in order to neutralize the antibodies in the plasma fraction(3). Many large blood banks use this method for all transfusions, regardless of the type of the recipient.

### *Technical Aspects*

Most hospitals have a technician who knows how to type and cross-match blood

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2. (a) U. S. Office of Civilian Defense: O.C.D. Manual 2204-1. A Technical Manual on the Preservation and Transfusions of Whole Human Blood, pp. 3-22, November. 1942.
   (b) Tisdall, L. H.: Present Status of Transfusion of Whole Blood and Its Derivatives in Obstetrics and Gynecology, Am. J. Obst. & Gynec. 52:788-793 (Nov.) 1946.
3. (a) Witebsky, E., Klendshoj, N., and Swanson, P.: Preparation and Transfusion of Safe Universal Blood, J.A.M.A. 116:2654-2656 (June 14) 1941.
   (b) Tisdall, L. H., Garland, D. M., and Wiener, A. S.: A Critical Analysis of the Value of the Addition of A and B Group-Specific Substances to Group O Blood for Use as Universal Donor Blood, J. Lab. & Clin. Med. 31:437-443 (April) 1946.

and is capable of running a blood bank. Much guidance can be obtained from the company which furnishes the donor sets, and the directions for using these sets should be followed meticulously.

Commercially prepared A, B, and Rh typing sera(4) are usually far superior to that obtained locally from bloods of known type but unknown titer. The commercial sera are furnished in convenient dropping bottles and should be kept sterile, since bacterial contamination causes deterioration of the titer. If the technique of using these sera is not already known, it may be learned from the printed directions accompanying each shipment or from standard textbooks on the subject(5).

There are several satisfactory methods of cross-matching blood(6). The most widely accepted is the test-tube technique. For this test two small glass test tubes (Wassermann or Kahn tubes) are set up, one (major side) containing six drops each of the donor's cells and patient's serum, the other (minor side) containing six drops each of the donor's serum and patient's cells. The tubes are shaken occasionally while standing for ten minutes; they are then centrifuged for three minutes at 1500 revolutions per minute, and are examined grossly and microscopically for agglutination.

### *Summary and Conclusions*

1. Blood transfusions have been employed in North Carolina in less than 10 per cent of the obstetric emergencies associated with hemorrhage.
2. Blood banks could be maintained in the smaller hospitals throughout the state.
3. In rural areas where a blood bank is not feasible, volunteer donors may be kept available for emergency transfusions.
4. The technique of maintaining a blood bank is discussed briefly.

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4. Unger, L. J., Weinberg, M., and Lefkon, M.: The Rh Factor as Applied to the Operation of Blood Banks, Am. J. Clin. Path. 16:498-505 (Aug.) 1946.
5. Wiener, A. S.: Blood Groups and Transfusion, ed. 3, Springfield, Ill., Chas. C. Thomas, Publisher, 1943.
6. (a) Kolmer, J. A. and Boerner, F.: Approved Laboratory Technic. ed. 4, New York, D. Appleton-Century Co., Inc., 1945, pp. 650-654.
   (b) Kracke, Roy R. and Parker, Francis P.: A Textbook of Clinical Pathology, ed. 2, Baltimore, The Williams and Wilkins Co., 1940, pp. 205-216.

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**Almost four times as many veterans** are receiving Veterans Administration outpatient treatment now as a year ago, making additional VA hospital beds available for the more seriously ill veterans.

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# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*
DURHAM

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## VIII

## JAMES MARION SIMS (1813-1883)

James Marion Sims was one of the founders of modern gynecology and will always occupy a place of well deserved importance in the history of the subject. This celebrated American surgeon, of English and Scottish descent, was born on January 25, 1813, near Hanging Rock Creek, Lancaster County, South Carolina, the eldest of a family of eight children. The first school which he attended, in 1818, was a primitive log cabin affair in which flogging of pupils was an accepted part of an early education. Later he attended the newly erected Franklin Academy: here he prepared for admission to the College of South Carolina, at Columbia. He was admitted to the college at the age of 19, and attracted no particular attention beyond that accorded his handsomely chiseled face, his small and delicate physique, his genial smile, and his happy and carefree disposition. His academic career failed to inspire him; he was an indifferent student, much preferring social activities to Latin or Greek. At the close of his college years, he decided to study medicine only as a means of justifying his parents' confidence in him.

He began the study of anatomy and surgery as an apprentice to Dr. B. Churchill Jones, a practitioner in Lancaster, who was more interested in surgery than in teaching medicine to a student. As a result, Sims gained little knowledge by this custom of the times. We soon find him attending a course of lectures in the Medical College at Charleston, South Carolina. This institution at that time offered only an indifferent medical training. After attending two series of lectures Sims enrolled at the Jefferson Medical College in Philadelphia, where he says he enjoyed the practical lectures on surgery given by Professor McClellan, the famous surgeon and father of the distinguished Union general, George B. McClellan.

With a keen sense of his limitations as a physician, Sims finished his examination and received his M.D. degree in 1835. He returned to Lancaster to practice; his equipment included a set of surgical instruments, seven books, and a chestful of medicines. These proved inadequate even for Lancaster, for we find that he soon moved to Mount Meigs, Alabama, where in partnership with Dr. Bolling A. Blakey he was soon introduced into a large practice among the planting gentry. In the meantime he had married Theresa Jones, the daughter of his old preceptor in medicine at Lancaster.

Everything went well until 1840, when malarial fevers erupted in epidemic form, and Sims and his entire family were wracked by chills and intermittent fevers. His savings gone, his health impaired, completely discouraged, he decided to remove to a healthier climate; only by chance did he settle in Montgomery, Alabama, where during the first year he was aided by steadfast friends and trusting creditors in providing for the needs of his growing family.

The year 1845 was to be a memorable one; it was the turning point in his career. Heretofore Sims had been little interested in medicine, except as a mode of livelihood. In Montgomery his viewpoint changed abruptly, and he settled down to serious work, selling his guns and his hunters and giving away his hound. His mind was now wholly absorbed in developing his surgical talents. At 27 years of age, Marion Sims was no longer an adolescent but an adult entering on his life's work.

Montgomery was a large and prosperous community. The medical profession was composed of able and talented physicians. Sims moved easily among them and soon his growing general practice and his increasing reputation as a skillful surgeon rendered him secure and prosperous. At this time he has been described as a man of medium height with a handsome face, a benevolent, lively, and winning expression of countenance, dark eyes, chestnut hair, and an erect, slender, and boyish-looking figure; he was mercurial in disposition, enthusiastic in his pursuits, unaffected in his address, kind in his deportment, and always able to say something to make another feel pleasant and happy.

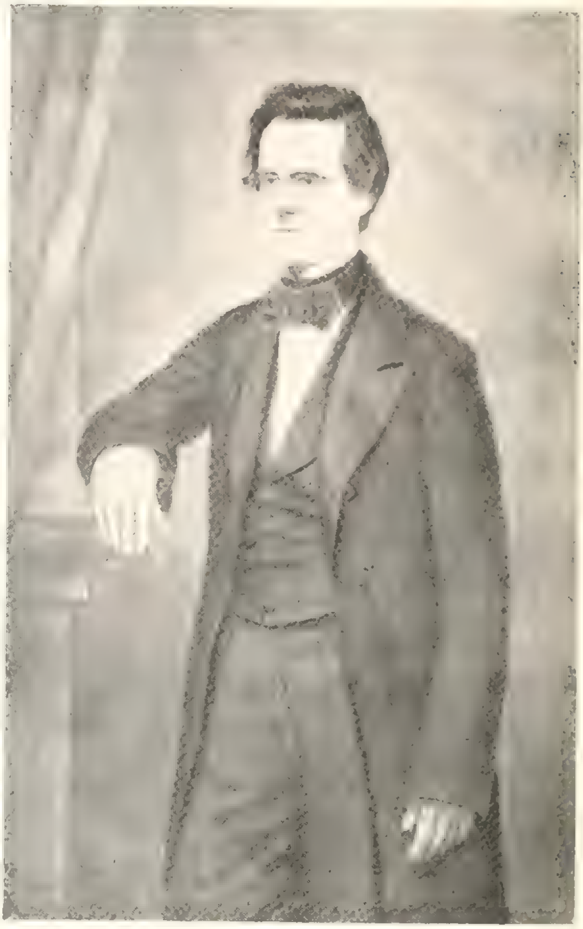

Fig. 1. James Marion Sims in 1857.

In Montgomery he entered on his experiments for the cure of vesico-vaginal fistula; for the purpose he erected a one-story, eight-bed hospital in the rear of his home. Later its capacity was increased to sixteen beds. The accidental discovery that the knee-chest position permitted ballooning of the vagina, together with the development of the early bent pewter spoons into the silver speculum of Sims, soon followed; now the fistulous opening could be seen. The third step leading to the successful performance of the operation was the discovery of silver-wire sutures. After three years of trial and error and discouragement, after he had operated unsuccessully as many as thirty times on a single patient, all his efforts were finally rewarded: his patient was cured. This first successful operation took place on June 21, 1849.

Sims continued to operate and to cure his patients. He became the most successful local surgeon, all his prospects seemed bright, and he proudly and abruptly refused the chair of surgery at the New Orleans Medical School. Then tragedy struck swiftly in the Sims family. A favored son died of a gastrointestinal malady. Sims was overcome by his great loss. Through overwork and constant worry he became an easy prey to infection. Shortly he was bedridden, suffering from chronic colitis—a type of disease which appears to have been particularly fatal at that time. Feeling certain that death would soon overtake him, he decided to announce his discovery by sending his manuscript on the cure of vesico-vaginal fistula to the editor of the *American Journal of Medical Sciences.* The announcement of his 6 successful cases attracted the attention of surgeons throughout the country; in many quarters it was received with incredulity.

Early in the autumn of 1853, in a last desperate attempt to regain his health, Sims decided to settle permanently in New York City, where the purity of Croton water and the better climatic conditions contributed to the relief of his infirmity. When he took this step, the idea of establishing a woman's hospital for the cure of vesico-vaginal fistula was surely in a nebulous state in his mind; he was still a very sick man, considerably emaciated, fragile, nervous, at times irritable, and frequently worried about beginning his surgical career again in a strange city, among an alien Yankee society.

However, we soon find him confiding his plans for establishing a woman's hospital to Drs. John Wakefield Francis and Valentine Mott. They in turn referred him to other influential medical personages. After many months of high hopes he found that the members of the medical profession in New York were not interested in his plans but only in performing his operation in their various hospitals. Then, by chance, he met Henri Luther Stuart, the unsung hero of the Woman's Hospital. It was through Stuart's financial and literary efforts that a special meeting was arranged at which the profession and public heard a lecture by Sims on the cure of vesico-vaginal fistula. Shortly afterwards Sims interested several influential women in his plans, and in spite of considerable medical opposition a building was rented at 83 Madison Avenue which would accommodate thirty beds for the treatment of those suffering from vesico-vaginal fistula. The hospital first opened its doors on May 4, 1855; all the beds were soon filled, and Sims was performing operations for vesico-vaginal fistula on an average of one each day.

An interesting account of Sims as a surgeon has been given by T. Addis Emmet, who was appointed assistant surgeon at the Woman's Hospital in 1855 and who succeeded Sims as surgeon-in-chief when the violent sentiments of the Civil War period drove Sims, firmly in sympathy with his native South, from New York to Europe. Emmet writes that Sims

> "was by nature a surgeon and one of the most dexterous operators I ever witnessed. He was bold and self reliant, never at a loss, and his ingenuity was unequalled. He was in no sense a plodder, for his mind and body were always too restless and active. He was so fertile in resource when I first knew him that he perfected scarcely a tithe of the brilliant conceptions passing constantly through his mind, and it was impossible to see him operate the most simple operation without learning something new."

Space does not permit a full account of Sims's later career. Though his connection with the hospital he founded was severed during the sixties and again, finally, in 1874, he rose steadily to eminence both in America and abroad and came to be regarded as the foremost gynecologist of his day. He died in New York on November 13, 1883.

Sims's great achievement was not that which is so commonly but erroneously attributed to him—namely, priority in the cure of vesico-vaginal fistula—but rather that of perfecting and popularizing a technique which was simple in principle and more nearly universally applicable than any technique previously devised. The chief features of this technique were the use of the vaginal speculum and silver sutures; the uniform and consistent success attained by Sims demonstrated that when the method was correctly applied primary union became the rule, not the exception. Thus this operation was added to the growing list of surgical masterpieces.

James Pratt Marr, M.D.
New York City

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**Of the 42,081 veteran-patients** admitted to Veterans Administration hospitals during February, 5,128 had neuropsychiatric disorders, 1,839 were tuberculosis cases, and the remaining 35,114 were general medical and surgical patients.

# North Carolina Medical Journal

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AUGUST, 1947

## "THE UNAUTHORIZED AND ILLEGAL EXPENDITURE OF PUBLIC MONEYS"

One of the most important publications that the Government Printing Office has ever issued is House Report No. 786, entitled "Investigation of the Participation of Federal Officials in the Formation and Operation of Health Workshops." It is the report of the Committee on Expenditures in the Executive Departments—or, rather, of a subcommittee appointed to investigate the propaganda activities of federal employees in the field of socialized medicine.

The revelations of this committee are so astounding that much of its report will be quoted verbatim.

"Your committee . . . finds that at least six agencies in the executive branch are using Government funds in an improper manner for propaganda activities supporting compulsory national health insurance, or what certain witnesses and authors of propaganda refer to as socialized medicine, in the United States."

"The departments, bureaus, and agencies known to have participated in this campaign are:

"1. The United States Public Health Service;
"2. The Children's Bureau;
"3. The Office of Education;
"4. The United States Employment Service;
"5. The Department of Agriculture; and
"6. Bureau of Research and Statistics, Social Security Board.

"Your committee finds that the use of Federal funds for the purpose of influencing legislation before Congress is unlawful under section 201, title 18, of the United States Code. We have, therefore, brought these matters to the attention of the Department of Justice, with a request that the Attorney General at once initiate proceedings to stop this unauthorized and illegal expenditure of public moneys."

The committee has found that

"The latest figures available from the Budget Bureau show that for the fiscal year 1946 total expenditures in the executive branch for publicity and propaganda activities were $75,000,000. During that fiscal year 45,000 Federal employees were engaged, full or part time, in such activities. The most recent prior compilation by the Budget Bureau covering the fiscal year 1941 showed total publicity expenditures amounting to $27,770,000. An increase of approximately 300 percent in Federal expenditures for publicity and propaganda in a period of 5 years is deemed by your committee to be a proper subject for inquiry by the Congress."

The committee's report outlines the methods used by federal employees to build up pressure for compulsory health insurance to be administered by the federal government. The first meeting in furtherance of this objective was held in Washington, and was attended only by ten full-time employees of the United States Public Health Service. The second, held at the University of Chicago, was attended by twenty persons; nine were government employees, eleven were representatives of the C.I.O., the A.F. of L., and the Farmers' Union.

The first "health workshop" was held in St. Paul, with eighty participants, fifteen of them government employees. The second health workshop was held in Jamestown, North Dakota, and was presided over by Dr. Mayhew Derryberry (Ph.D.), of the United States Public Health Service. "Apart from Federal personnel, there were no doctors of medicine in attendance at this meeting as delegates. The testimony before your committee indicates that no registered doctor of medicine was invited to participate.

> "All the evidence before your committee indicates that these health workshops were planned, conducted, and largely financed with Federal funds, by a key group on the Government pay roll, who used the workshop method of discussion subtly to generate public sentiment in behalf of . . . socialized medicine. It is evident from the record that most of the planning was done by the Federal officials in Washington prior to each workshop conference and that each meeting was devoted to their own purposes—that of organizing pressure groups to agitate for compulsory health insurance, as then pending in Congress.
>
> "In preparation for the Jamestown Health Workshop, the Public Health Service distributed in advance to all invited delegates a packet of pamphlets published by the CIO, A. F. of L., the Physicians' Forum (a propaganda agency for the Wagner-Murray-Dingell bill), and the Government bureaus, in support of . . . socialized medicine. These packets were mailed to the delegates in advance of the conference, at Federal expense. They urged that letters be written to Senators and Representatives, advocating immediate action on the Wagner-Murray-Dingell bill."
>
> "Your committee has . . . a report from the General Accounting Office, showing that various Federal agencies paid out a total of $1,950 in traveling expenses of Federal employees to and from the Jamestown Health Workshop. This conference took 18 Federal officials away from their desks for a total of 126 man-days.
>
> "Another report from the General Accounting Office shows that the Federal Government paid almost $5,000 in traveling expenses of Federal employees for the series of five health workshop conferences and planning meetings held throughout the country before our investigation began."

The committee found that at these workshops the federal officials had the task of indoctrinating the other delegates.

> "One section of the 'action program,' approved by the conference, urged 'that congressional candidates and incumbents be polled by the committee, on their stand on the national health program, and that their opinions be sent to the State organizations for publication.'
>
> "In the opinion of your committee, this recital presents the complete picture of Government propaganda in action. The Federal employees arrange the meeting, invite the delegates, train the delegates, preside at the meetings, and then frame the formal summary of resolutions and actions.
>
> "And all of this is paid for with public moneys never authorized or approved by Congress for these or any like purposes."

It may be recalled that the National Physicians Committee has been the principal target of abuse for the proponents of socialized medicine, and that over a nation-wide radio broadcast this organization was accused of having "spent one million dollars for the publication and distribution of one pamphlet." Dr. Edward Cary, appearing before the Murray Committee, refuted this accusation by showing that in six years the National Physicians Committee had spent only $905,359.23 on all its activities. It is a tribute to the N.P.C.'s management that with this sum, paltry by comparison with the seventy-five million dollars spent by federal government agencies in one year, a handful of men have been able to withstand the onslaught of 45,000 federal employees "engaged, full or part time," in propaganda activities. Perhaps, after all, there is justification for Abraham Lincoln's "faith that right makes might."

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## INTRODUCING THE AUTHOR OF "ASBESTOS ARCHIVES"

A unique one-man medical publication has recently been discontinued. This was the "Asbestos Archives," written and published since 1934 by the secretary of Indiana's Madison County Medical Society and former president of the Indiana State Medical Association, Dr. M. A. Austin of Anderson, Indiana. A desultory correspondence between Dr. Austin and the editor of the NORTH CAROLINA MEDICAL JOURNAL—begun by a note of appreciation for an especially racy "Archive"—resulted in a meeting in Winston-Salem last April. One by-product of an evening of conversation was a promise from Dr. Austin to write an editorial for the NORTH CAROLINA MEDICAL JOURNAL. This editorial, published below, gives an idea of the entertainment supplied monthly for the readers of the "Asbestos Archives."

It is worth noting that Dr. Austin, in a series of articles on medical economics published between 1908 and 1912, commented on the medical situation in Europe and offered the suggestion that in this country the best way for the public to provide for sickness was by means of voluntary prepaid insurance.

* * * *

## TO WHOM IT MAY CONCERN

In no other vocation has the cost of service increased more in the last few years than in the care of the sick and injured. Most of this increase has been in hospital bills, for medical fees of physicians and surgeons have not been raised proportionately. The increased cost of hospitalization has been due in part to the higher price of food and to the higher wages paid hospital personnel, but the greatest expense has been in the special services of the laboratory and x-ray department. Frequently a patient pays $9 to $10 a day for a private room, $5 to $10 a day for laboratory and x-ray work, and $8 to $24 a day for one to three special nurses. *No hospital insurance company writes a policy covering such an expense.* Furthermore, the hospital bill is due and payable before any physicians' or surgeons' fees are to be considered.

It is no wonder that labor unions and multitudes of other organizations are now backing plans for socialized medicine. The members of these organizations have not been told, however, that the taxes for such a scheme will be at least 6 per cent of their income. If sick benefits are added to this Utopian scheme, the paper work of the average physician will make him wish he was in the army.

Speaking of paper work, the requirements for case histories in the average standardized hospital now demand more time than we can give to our patients. Every time I turn to "Progress Notes," I want to write, "Little by little and bit by bit, God in his wisdom has healed this slit."

For too many years I have felt like the fellow in the army who wrote home, a short time after his induction, that he had gained 60 pounds since he went in—2 pounds in weight and 58 pounds of equipment. My appointment book has more notations calling my attention to nonproductive tax loads and assessments than appointments for patients, and more are being added each year. In the near future a certified public accountant will be a necessary part of every doctor's office force. We have our city, county, and state taxes twice a year; our quarterly gross income tax reports to the state and estimated income tax to the federal government; our narcotic license, our automobile license, our state registration fee, and in some states a county and city license also; our intangible tax reports; our staff dues, county society, state society, A.M.A., and specialty board dues; our Social Security reports for employees, and payment of their unemployment and old age and retirement assessments. If we go to a show to forget it we pay a 20 per cent tax, and when we board a train to run away from it we pay a 15 per cent tax on our ticket and a 20 per cent tax on the luggage we carry. We can't even buy our wives a diamond bracelet without the government's getting a 20 per cent cut, and a mink coat takes the same percentage.

The family who have been parasites on our community all their lives shifted the township's load to social security when the old folks got to be 65 years old, and they receive $72 a month without taxes, worries, or any responsibilities. This is $864 a year. A thrifty, hard-working, tax-paying citizen who has invested his hard-earned savings from a lifetime of effort and has accumulated $40,000 can't expect to have as much to live on in his old age as the pauper, for his net returns are seldom over 2 per cent, or $800 a year.

For this is what I'm sayin',
There ain't no use in prayin'
For what you'll never get.
There ain't no use in tryin'
And t'won't do no good in cryin';
The New Deal is all wet.
Just be a lazy so-and-so;
It's lots of fun to loaf, you know;
For now they take what you used to save
And promise you orchids from birth to the grave,
And it's nice to believe—
If you can do it.

M. A. Austin, M.D.
Anderson, Indiana

* * * *

## A BRITISH VIEW OF AMERICAN EDUCATION

One of the pressing problems of our country today is that of maintaining an adequate supply of competent teachers for our public schools. Some light is thrown upon the situation by the very pertinent observations of an English woman, Miss Isobel Blair, who has just completed a year in America as one of seventy-five British exchange teachers(1). Her comments are not all flattering, but they are revealing.

Miss Blair's first feeling of disillusionment came when she was told in an orientation course at Columbia University that "we should have to find out when we reached our destinations just what rules of behaviour were in force for teachers in that particular area, and whether it would be permissible to smoke in public!" Her tart comment was,

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1. Blair, Isobel: Some Transatlantic Comparisons, Delta Kappa Gamma Bull. v. 13, no. 4 (Summer) 1947, pp. 5-8.

"The 20th century indeed? That sort of thing went out with crinolines in Britain, and we certainly hadn't expected to encounter it in the U.S.A."

Miss Blair's reaction to the acute shortage of teachers in America gives food for thought:

> "While teachers in Britain during the war were considered of such importance that they were not called up into the Forces, in the case of men above the age of 25 and later 35, and in the case of women not allowed to leave their posts at all, American teachers apparently had left by thousands to undertake war jobs which were considered more important than the training and moulding of the postwar generation."
>
> "In America apparently the number of Emergency Certificates has risen from 5,000 in 1941 to 110,000 in 1946. This sounds strange to me when I consider that our 1946 Education Act in Britain has abolished altogether the practice of appointing uncertificated teachers as was formerly done in rural districts.
>
> "Furthermore, it seems to me that the trend in America whereby thousands of teachers are betaking themselves to other walks of life is in direct opposition to the trend in Britain, whereby thousands of people from other occupations are being welcomed into the teaching profession with the recognition that they have a great deal of valuable knowledge and experience to contribute."

Miss Blair commented upon the contrast between Britain, where "we have concentrated too much upon the children who are intellectually brilliant," and the United States, where "the prevailing system of education is one suited to the average child, with much provision made for those who are handicapped and retarded; the brilliant child seems to merit no special consideration."

Miss Blair may not know that Thomas Jefferson — yes, Jefferson, the democrat— favored elementary education for all, but higher education only for those capable of profiting by it.

One of the chief reasons for the present low status of American education is to be found in Miss Blair's statement that

> "Britain, which at present is grappling with grave economic problems, is spending 3 per cent of her national income on education. America, a land of great economic prosperity, is spending 1½ per cent of her national income on education. This, of course, is evident in a comparison of salaries. The American average minimum salary of $1,782 sounds a great deal more than the British average minimum salary of 285 pounds or $1,140, but when one compares the cost of living in both countries one reaches a very different conclusion."
>
> "In America, the land of hustle, it is evidently expected that a teacher can recover from a major illness in five days, since that is the amount of leave allowed her on salary. In Britain it is recognized that the age of miracles has not yet arrived, and a teacher is allowed six weeks on salary to recuperate from illness.
>
> "It is significant, I think, that the average age of American Exchange Teachers in Britain this year is 42 years, while that of British teachers in America is 32. The inference is clear, I think, that the younger people in America have left the profession while the going was good."

* * * *

## THE NATIONAL PHYSICIANS COMMITTEE VINDICATED

One of the many controversial issues contained in the widely publicized report of the Raymond Rich Associates, dealing with the public relations of the American Medical Association, was its criticism of the National Physicians Committee—criticism admittedly based on hearsay evidence. At the December meeting of the House of Delegates of the A.M.A., the reference committee appointed to study the Rich Report—of which Dr. William Bates of Pennsylvania was chairman —recommended, "in view of the controversial nature of the Rich Report and in view of lack of documentary evidence relating to the National Physicians Committee . . . further study of this portion of the report."

At the next meeting of the House, in Atlantic City, the Bates Committee offered a supplementary report dealing with the National Physicians Committee. The report stated clearly that every charge made against the National Physicians Committee by the Rich Associates had been investigated and found to be absolutely without foundation. This portion of the report, exonerating the National Physicians Committee, was adopted unanimously. A second recommendation of the Bates Committee moved a vote of confidence in the N.P.C. A few members objected to this recommendation, on the ground that the A.M.A. might lose some of its dignity as a result of being associated with an organization which is frankly engaged in propaganda and in lobbying. None denied that the National Physicians Committee had done more than any other agency to save the country from political control of medicine, but some doubted the expediency of having it recognized by the A.M.A. Dr. Holman Taylor, of Texas, scored a bullseye when he compared the A.M.A. to a gentleman who, after being rescued from a robber by a prize-fighter, brushed his clothes and refused to thank his rescuer because he was not his social equal. The House roared with laughter, and then voted by a large majority to endorse the National Physicians Committee.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

JURISDICTION: *A defendant in a divorce action can not consent to the decree but can only elect to defend or abstain from answering. If defendant is insane, defense must be made by guardian.*

The plaintiff and defendant in this case were married in 1919. In July, 1938, they entered into a separation agreement, and since that time have lived separate and apart. In July, 1942, the defendant was adjudged *non compos mentis* and committed to the State Hospital at Morganton. In April, 1946, summons in connection with a divorce action was served upon the defendant by the sheriff of Burke County in the manner provided by law, and shortly thereafter, on application of the plaintiff, a guardian *ad litem* was appointed for the defendant. Being duly served with summons, he appeared and answered. In Superior Court the guardian *ad litem* moved to dismiss the action, stating that the questions involved were so personal in nature to the defendant that the guardian could not properly answer and defend the action, and that no one other than the mentally ill defendant could properly defend. It was also contended by the guardian that the court, for this reason, had no jurisdiction over the case. The motion was allowed by the judge in Superior Court, and the action was dismissed. The plaintiff excepted and appealed.

When the case reached the Supreme Court upon appeal, the judgment of the court below was reversed.

The court held that the right to sue for divorce must be regarded as "strictly personal to the aggrieved person." One who seeks a divorce must apply for it and prosecute the action. A defendant after being sued for divorce can not assent to the decree, but is required to defend or abstain from answering. An insane person who is a defendant in such an action must appear through his or her duly appointed guardian, who must answer and defend for the person *non compos mentis*. The insanity of the defendant, in this case rendering her incapable of appearing, did not defeat the jurisdiction of the court. The court stated further that it did not enter into the merits of the case, but only determined the jurisdictional question. It may be stated here that in only one instance do the statutes of North Carolina provide for divorce from an insane person. In such cases the incompetent must have been confined in a mental hospital continuously for a period of ten years, and evidence must show that the defendant is suffering from an incurable mental disease.

Because of the defendant's mental condition, this action will probably fail when it is returned for trial in lower court, unless the court holds that the cause of action accrued before the institution of the suit for divorce. This would of course be at the end of a two-year period during which the defendant and plaintiff lived separate and apart.

Most of the divorces granted in this state during the past few years in which an insane person has been the defendant came about as a result of the failure of the defendant to answer and plead. The court in such cases had no knowledge of the situation, and granted the decrees upon the apparent legality of the plaintiff's complaint, and the evidence submitted. (North Carolina Supreme Court, Sept., 1946. V. 226 N.C., p. 544.)

## VETERANS ADMINISTRATION

Two nationally-known doctors have been added to the staff of the Veterans Administration Department of Medicine and Surgery in Washington, D. C., Dr. Paul R. Hawley, chief medical director, announced recently.

They are:

Dr. George Marshall Lyon of Huntington, W. Va., who will develop laboratories for the use of radioactive isotopes in the treatment of veteran-patients in VA's 123 hospitals.

Dr. Louis G. Welt, clinical instructor of medicine at Yale Medical School since July, 1946, and practitioner of internal medicine at Willimantic, Conn., who will engage in research projects for the Research and Education Service of VA's Department of Medicine and Surgery.

* * * *

Dr. Paul R. Hawley, chief medical director of Veterans Administration who was officer-in-charge of all medical care in the European Theater of Operations during World War II, has been awarded the Gorgas Award for 1947.

The award is given annually by the executive council of the Association of Military Surgeons to some person who has made a notable contribution in the field of military medicine. It is sponsored by Wyeth, Incorporated, of Philadelphia, Pa.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX August, 1947 No. 8

HOSPITAL surveys now under way will almost certainly result in greatly increased hospital facilities everywhere in the U. S. within the next decade. It would be unfortunate if in the enthusiasm for building bigger and better hospitals, the problems of those already in existence should be shelved even temporarily. Tuberculosis, whether recognized or not, is present in all mental hospitals. It can be controlled if the cases are discovered, segregated and treated.

### Tuberculosis in Mental Schools and Hospitals in Ohio

A report of the extent of the tuberculosis problem in the mental schools and hospitals in Ohio reveals the existence of a reservoir of tuberculosis which constitutes a serious public health problem. This source of infection has not received the attention it demands.

The Ohio Deartment of Public Welfare, which is responsible for the care of patients of state institutions, has long been interested in determining the prevalence of tuberculosis in the mental schools and hospitals of the state to be used as the basis for the development of an adequate control program. The potential hazards of institutional life to the physical welfare of both patients and employees were recognized. However, it was realized that only through a mass survey would it be possible to ascertain the precise nature of the hazard and thereby provide the fundamental knowledge upon which to build this future program of tuberculosis control.

The present investigation embraced the total population of twelve of the fourteen mental schools and hospitals in the state. In order to obtain a basis for study of the tuberculosis problem in these institutions a review of the deaths occurring in the fourteen state institutions during the five-year period ending December 31, 1945 was made. During this period 1,094 or 13 per cent of all the deaths were due to tuberculosis. In 1943, there were 128 known cases in these institutions, in 1944 this had risen to 148 known cases. In 1945, shortly after the start of the survey, 351 cases were known or 1.55 per tuberculosis death.

The total number of individuals examined was 25,351 of whom 22,387 were patients and 2,964 were employees. X-ray evidence of tuberculosis (non-calcified primary, reinfection-type tuberculosis, pleurisy with effusion or silicosis with infection) was found in 1,474 or six per cent of the total. Another two per cent of the total screened revealed evidence of non-tuberculous lung pathology.

Of the 1,474 cases of tuberculosis, 1,379 or 94 per cent were patients and 95 or six per cent were employees. Distribution of tuberculosis by stages of disease was discovered among the resident patients and employees in approximately the same relation in which it has been found in surveys of general population groups.

Distribution of tuberculosis by age groups revealed a striking similarity between the occurrence of the disease in the patients and the employees—71 per cent of both groups were in the age groups over 45 years. The gradual increase in the percentage of cases discovered as the age groups advance suggests that prolonged residence in the institution may be an important factor in producing new cases.

The findings in this survey have served to accentuate the need for an adequate tuberculosis control program for the mental institutions in the state of Ohio. Six per cent of all the patients and three per cent of the employees were tuberculous. These rates together with the findings of a greater percentage of tuberculosis in the older residents suggest that a large part of the affected groups contract their infection during their residence in the institution.

Because of the prolonged intimate association which is a part of institutional segregation, exposure from unknown and non-isolated infectious cases must occur. Tuberculosis among employees merits the serious consideration of hospital authorities. Whatever and wherever the source of an employee's tuberculous infection, it can hardly be denied that harmful exposure to unrecognized cases occurs in many institutions. Through release of unknown communicable cases or through probationary visits or by discharge, the exposure of the general population to the disease becomes a problem of first importance. Protection of the physical health of the patient, mentally normal or psychotic, is a fundamental responsibility, yet this pool of infection has been allowed to increase abundantly. It can only be dried up through systematic surveys applied in this direction.

Fundamentally the problem stems from the commitment of individuals with infectious tuberculosis and the development of new cases while these individuals are in residence. Cases can be detected on entrance to the institution through routine screening X-rays of all admissions and preplacement X-rays of employees. Suspicious cases should be properly confirmed by the appropriate clinical and laboratory procedures which comprise an adequate diagnostic whole. Cases that develop during residence in the institution can be found through periodic routine screening of the entire institutional personnel. Active, infectious cases found on admission or during periodic check-ups should be isolated in hospital facilities especially provided for this purpose. A large percentage of suspect cases will need further observation in order to determine the activity and infectiousness of the disease. Such persons should be isolated in a separate tuberculosis unit, where further diagnostic studies can be made and their exact status established. When these cases no longer constitute a public health problem, they may be returned to their respective institutions.

Treatment of the mentally ill patient with tuberculosis is essentially the same as that prescribed for the mentally normal tuberculous patient. Rest is the basic therapeutic measure and should be obtained, if necessary, by administration of sedatives. Sputum conversion is one of the objectives of treatment and collapse therapy, as indicated, can and should be utilized to achieve this goal.

**Tuberculosis in Mental Schools and Hospitals in Ohio, Mark W. Garry, M.D., Ohio Public Health, September, 1946.**

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**There can be no relaxation of effort** until tuberculosis has been completely and permanently eradicated—a goal that at present appears possible only through continuous application of discoveries and advances already attained. Consolidation of the gains made and progress toward eventual eradication depend on a ceaseless campaign of case finding, rehabilitation and, most important of all, health education.—N. E. Jour. Med., Dec. 5, 1946.

# BULLETIN BOARD

## NOTICE OF MEETING OF EXECUTIVE COMMITTEE

President Sharpe has called a meeting of the Executive Committee for Sunday, September 7 at 11:00 a.m. at Sedgefield Inn.

## PRESIDENT'S MESSAGE

One of the most important resolutions adopted by the House of Delegates at Virginia Beach was that authorizing the appointment of a committee to study the problem of hospital and medical care insurance. This committee, of which Dr. V. K. Hart of Charlotte is chairman, is to make its report and recommendations to the Executive Committee.

It is my desire that every doctor in the state be acquainted with the work of this important committee, and that this resolution be discussed in the county societies and with the district councilors. The Executive Committee and Dr. Hart's committee will appreciate receiving suggestions and criticisms.

The resolution adopted by the House of Delegates appears below:

### RESOLUTION

WHEREAS, There has been a constant increase in hospital costs with a constantly widening discrepancy between the amount of insurance paid and the amount of the bill; and,

WHEREAS, The Blue Cross hospital plan has found wide and favorable acceptance among the people of North Carolina; and,

WHEREAS, This plan was originally sponsored through the Hospital Saving Association by the North Carolina Medical Society; and,

WHEREAS, There has been an increase in sale of surgical coverage as well as hospital coverage; and,

WHEREAS, There has been no medical coverage by the Blue Cross or other plans; and,

WHEREAS, There has been and still is a wide discrepancy between the fees paid in surgical coverage and those charged by physicians; and,

WHEREAS, There has been and is national propaganda for compulsory health insurance;

BE IT RESOLVED by the House of Delegates of the North Carolina State Society that they endorse and advocate the following measures for immediate consideration by the members of the Society.

1. That a representative committee, including all surgical and medical specialties and representing the different sections of the state, be appointed by the president to review in the immediate future the whole question of hospital, medical, and surgical insurance. The executive officer of the Hospital Saving Association or merged corporation shall be an *ex officio member.*

2. That this committee make specific recommendations as to any practical expansions of hospital insurance.

3. That in particular they outline a fee schedule for all surgical procedures for people of incomes up to and including $2,000 for the individual and $3,000 for the family.

4. That this committee likewise recommend a similar fee schedule to cover all major illnesses requiring hospitalization.

5. That this committee be empowered to change or modify the income group as they see fit, or conditions pertaining thereto.

6. That the Hospital Saving Association or merged corporation be asked to cooperate in underwriting any changes in hospital coverage recommended by the committee. Also that they be asked to incorporate in new policies for total coverage such medical and surgical and obstetric coverage as may be advised.

7. That the House of Delegates recommend that the members of the State Society voluntarily enter into an agreement with the Hospital Saving Association or merged corporation to abide by fee schedules as agreed upon by the committee and to accept the same as payment in full for the above specified income group.

8. That the Committee shall make its recommendations to the Executive Committee of the North Carolina State Medical Society for approval or disapproval. Approval shall constitute authority for inauguration of the program.

FRANK A. SHARPE, M.D.
Greensboro

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

Since July 1, 1947, various departments in the Bowman Gray School of Medicine of Wake Forest College have been awarded a total of $26,100.00 in research grants from the National Foundation for Infantile Paralysis, the John and Mary R. Markle Foundation, Life Insurance Medical Research Fund, and the Roche Memorial Foundation.

Experiments are being continued by Dr. Robert B. Lawson, associate professor of pediatrics, and Dr. J. Maxwell Little, associate professor of physiology and pharmacology, under the auspices of the National Foundation for Infantile Paralysis, to determine the conditions most favorable to growth of the polio virus in eggs.

Dr. Harold D. Green, director of the Department of Physiology and Pharmacology, is making a study of the effect of various drugs on circulation of the blood. He will be assisted in his experiments by Dr. J. Richard Bobb and Mr. Donald Kunze.

* * * *

At a recent meeting of the Board of Trustees of the North Carolina Baptist Hospital, the addition of a sixth floor to the hospital was authorized. The new space will add forty beds to the present capacity of three hundred, and will alleviate the current bed shortage until the hospital moves into a new structure to be built on Graylyn Estate. The Building Committee, composed of J. B. Efird of Charlotte, John Knott of Charlotte, and Reid Holmes, administrator of the North Carolina Baptist Hospital, was authorized to proceed at once with building plans. It is anticipated that the addition will be built and equipped at an approximate cost of $85,000.00, and it is hoped that the building will be completed by late spring.

* * * *

Dr. Wingate Johnson has recently been named on a committee from the American Medical Association to study nursing needs in the United States, the main purpose being to investigate means of alleviating the present nursing shortage. The committee is composed of Dr. Thomas P. Murdock, Meriden, Connecticut, Chairman: Dr. Warren Draper, Deputy Surgeon General of the USPHS; Dr. Donald C. Smeltzer of Philadelphia, former president of the American Hospital Association; Dr. Lester R. Dragstedt, Chicago surgeon; and Dr. Wingate Johnson, professor of clinical medicine of the Bowman Gray School of Medicine of Wake Forest College.

## NEWS NOTES FROM THE STATE BOARD OF HEALTH

North Carolina's infant mortality rate for 1946 was 37.0 per one thousand live births, and its maternal mortality rate was 2.1 per one thousand live births. The infant mortality rate three decades ago was around 100 per one thousand live births, as compared with 37.0 last year, and the maternal death rate was around 20, as compared with 2.1 in 1946.

* * * *

At a recent meeting of the North Carolina Good Health Association Dr. Thomas Parran, Surgeon General of the United States Public Health Service, declared that it is entirely probable that North Carolina may lead the entire nation in the participation in federal funds for the erection of facilities designed to make adequate hospitalization available to every man, woman and child in the state.

During January, February and March of this year, there were 2,665 accidents on the public highways of North Carolina, of which 193 were fatal, 866 nonfatal, and 1,606 resulted in damage to property. The number of persons killed was 222, while 1,432 persons were injured—544 seriously, and 888 slightly.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

The forty-third annual meeting of the National Tuberculosis Association was held in San Francisco June 14-20. Those attending from North Carolina were: Dr. H. Stuart Willis, superintendent of the North Carolina Sanatoria; Dr. David T. Smith, Duke Medical School; Dr. Benjamin L. Brock, Veterans Administration, Oteen; Frank W. Webster, executive secretary of the NCTA; Miss Ruth Harris, executive secretary of the Mecklenburg County Tuberculosis Association; and Mrs. Mildred T. Greene, executive secretary of the Greensboro Tuberculosis Association. Dr. Willis, Dr. Brock and Frank W. Webster participated on the programs of this meeting.

Frank W. Webster was elected secretary-treasurer of the National Conference of Tuberculosis Secretaries. Mr. Webster held the position of secretary in 1946 and was elected secretary-treasurer for 1947 under the new constitution for NCTS.

* * * *

Dr. W. C. Hunter of Wilson was elected second vice president of the Wilson County Tuberculosis Association on June 16.

* * * *

The Mecklenburg County Tuberculosis and Health Association elected Dr. W. S. Cornell first vice president at its annual meeting on May 16. Drs. M. B. Bethel and E. H. Hand were named co-chairman of the seal sale.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

Dr. J. B. Bullitt of the University of North Carolina Medical School was guest speaker at the July meeting of the Edgecombe-Nash Counties Medical Society, held in Rocky Mount on July 9.

## NEWS NOTES

Dr. Boone Grant began the practice of pediatrics in Rocky Mount on August 1.

* * * *

Dr. Thomas Holt has recently become associated with Dr. John Lane of Rocky Mount in the practice of ophthalmology and otolaryngology.

* * * *

Dr. R. C. Sadler of Whiteville has announced that Dr. J. T. Wyche has become associated with him in the practice of medicine. Dr. Wyche, a graduate of Wake Forest College and the University of Pennsylvania School of Medicine, was recently released by the Navy after six years' service as a flight surgeon. He held the rank of lieutenant commander at the time of his release.

## THE AMERICAN COLLEGE OF PHYSICIANS

### Regional Meeting

The annual regional meeting of the American College of Physicians will be held on Friday, November 14, 1947, in Chapel Hill, North Carolina. Through Dr. Paul Whitaker, District Governor, and the committe for this year, a cordial invitation is extended to all physicians and students in this area to attend the scientific session in the afternoon. The Medical School of the University of North Carolina will be host. The program will be presented by Fellows and Associates of the College in this state.

* * * *

The American College of Physicians will conduct its Twenty-Ninth Annual Session at San Francisco, April 19-23, 1948. General headquarters will be at the Civic Auditorium.

Secretaries of medical societies are especially asked to note these dates and, in arranging meeting dates of their societies, to avoid conflicts with the College Meeting, for obvious mutual benefits.

* * * *

The American College of Physicians announces that a limited number of fellowships in medicine will be available from July 1, 1948 to June 30, 1949. These fellowships are designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in internal medicine. Assurance must be provided that the applicant will be acceptable in the laboratory or clinic of his choice and that he will be provided with the facilities necessary for the proper pursuit of his work.

The stipend will be from $2,200 to $3,000.

Application forms will be supplied on request to The American College of Physicians, 4200 Pine Street, Philadelphia 4, Pa., and must be submitted in duplicate not later than November 1, 1947. Announcement of the awards will be made as promptly as is possible.

## AMERICAN COLLEGE OF SURGEONS

The thirty-third annual Clinical Congress of the American College of Surgeons, including the twenty-sixth annual Hospital Standardization Conference, will be held at The Waldorf-Astoria, New York, from September 8 to 12. The five-day program features operative and nonoperative clinics in thirty-eight hospitals in New York and Brooklyn, and scientific sessions in general surgery and the surgical specialties, official meetings, hospital conferences, medical motion pictures, and educational and technical exhibits, at the headquarters hotel.

## AMERICAN ROENTGEN RAY SOCIETY

The forty-eighth annual meeting of the American Roentgen Ray Society will be held at Haddon Hall in Atlantic City, September 16-19, 1947. President Raymond C. Beeler, M.D., of Indianapolis, Indiana, announced that the Caldwell lecture this year would be delivered on Tuesday evening, September 16, by Dr. Merrill C. Sosman, Boston, professor of radiology of Harvard Medical School.

Three interesting symposia have been arranged for the four-day meeting by Dr. Ralph S. Bromer, of Philadelphia; Dr. W. Walter Wasson, of Denver, and Dr. U. V. Portmann, of Cleveland. Dr. B. R. Kirklin of the Mayo Clinic, Rochester, Minnesota, will be in charge of the instrutional courses to be offered each afternoon during the meeting.

## SECOND ANNUAL POSTGRADUATE COURSE IN DISEASES OF THE CHEST

The American College of Chest Physicians is sponsoring a second annual postgraduate course in diseases of the chest, to be held during the week of September 15-20, 1947, at the Municipal Tuberculosis Sanitarium, Chicago, Illinois.

The emphasis in this course will be placed on the newer development in all aspects of diagnosis and treatment of diseases of the chest.

The course will be limited to 30 physicians. Tuition fee is $50.00.

Further information may be secured at the office of the American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

## INTERNATIONAL COLLEGE OF SURGEONS

The International College of Surgeons, United States Chapter, will hold its Twelfth Annual Assembly and Convocation in Chicago, September 28 to October 4, 1947.

Copy of the program and detailed information may be obtained by writing Max Thorek, M.D., Co-chairman, 1516 Lake Shore Drive, Chicago, Illinois.

## PLANNED PARENTHOOD FEDERATION

Appointment of Dr. L. E. Kling, who on July 1 completed six years' service with the U. S. Public Health Service, as acting medical director of the Planned Parenthood Federation of America was announced recently by D. Kenneth Rose, national director, at the Federation's offices, 501 Madison Avenue. Dr. Kling is assuming his new duties at once.

## INFORMATION WANTED

Dr. Irma Henderson-Smathers of Asheville is attempting to write a history of women doctors in North Carolina. Her information is complete up to 1900 except for:

Olivia M. Nelon, Asheville address — graduate Women's Medical College, Ohio, 1895; State Board examination: 1895.

Joy Harris, Summerfield address — graduate Women's Medical College, Baltimore; State Board examination: 1896.

There is no record of either ever having joined the North Carolina Medical Society.

Anyone who remembers either of these doctors is asked to write Dr. Henderson-Smathers.

ATTENTION,
GENERAL PRACTITIONERS

FOR SALE: New office (for one or two) recently completed by a physician in Reidsville, N. C., who has had to retire on account of failing health. Purchaser of office can expect a well-paying practice at once. There is need of one or more general practitioners here.

Address Box 776, Reidsville, N. C.

## STATE BOARD OF MEDICAL EXAMINERS

### Questions Asked in the June, 1947, Examination

### ANATOMY, HISTOLOGY, AND EMBRYOLOGY

M. A. Pittman, M.D.

1. An injury to the shoulder joint region results in inability to abduct arm. Name chief muscle and nerve involved.
2. (a) Draw lateral view of vertebral column showing curve and number of vertebrae in each region.
   (b) Draw and label a typical lumbar vertebra.
3. Locate the following:
   (a) Olecranon process
   (b) Coracoid process
   (c) Os calcis
   (d) Calcaneus
   (e) Intercondyloid eminence
   (f) Semilunar cartilage
   (g) Incisura angularis
   (h) Hypothenar eminence
   (i) Speech center in a left-handed person
   (j) Thyroidea ima
   Is it always present?
4. Usually when an ambulatory patient enters office with fractured clavicle he will be holding elbow of injured side with opposite hand and his head will be tilted toward injured shoulder.
   Explain in a few words the reason for head being tilted toward injured shoulder.
5. (a) What month are fetal movements observed?
   (b) What is the length of fetus at that time?
   (c) What month do nails appear on the digits?
   (d) What period during menstrual cycle is conception most likely to occur?
6. (a) Define serous membrane and give three examples:
   (b) Define mucous membrane and give three examples:
   (c) What is the largest serous membrane in the body?

### CHEMISTRY

M. D. Bonner, M.D.

(Answer any five questions)

I. (1) Discuss briefly the factors which influence the absorption and retention of calcium in the animal organisms.
   (2) What foods would you recommend to a patient for whom an increased amount of dietary calcium is essential?
II. An adult male receives 3,000 calories in the daily food allowance. Calculate the grams of proteins and carbohydrates that should be included if the diet is to be balanced.
III. Discuss the chemistry and the function of glycogen.
IV. What test would apply to determine whether a stain was due to blood? Discuss each test and its value and limitations.
V. Discuss the occurrence, the chemical aspects, and the metabolism of nucleoproteins.
VI. Discuss the biological occurrence and the function of iron in the human organism.

### PHYSIOLOGY

M. D. Bonner, M.D.

(Answer any five questions)

I. Define cyanosis. Why does cyanosis occur in anoxic and stagnant anoxia, but not in histotoxic and anemic anoxia?
II. Describe in detail what is meant by "oxygen debt."
III. Describe and explain the effects of transection of the spinal cord at the sixth cervical segment upon
   (1) Arterial pressure
   (2) Diameter of the pupil
   (3) Knee jerk
IV. Discuss the factors which determine the activities of the gastric glands.
V. How are the functions of the kidneys affected by the adrenal and parathyroid glands?
VI. Account for the change in the output of the left ventricle in a man at rest and during vigorous muscular exercise.

### PATHOLOGY

Ivan Procter, M.D.

(Answer any six questions.)

I. Explain nature of necrosis, giving causes, cellular changes, and forms.
II. In a case of portal cirrhosis, explain development of
   (1) "Hobnail" liver
   (2) Esophageal varices
   (3) Ascites
   (4) Icterus
III. Discuss etiology, development, and all possible outcomes of myocardial infarction. Confine discussion to pathological description as far as possible.
IV. Discuss the pathogenesis of bronchiectasis.
V. Describe the gross and histologic appearance of the kidneys in a case of chronic pyelonephritis of childhood.
VI. Discuss carcinoma of the stomach as to
   (1) Gross and microscopic appearance
   (2) Spread
   (3) Complications
VII. Give the gross and microscopic pathology, as well as the etiology and pathogenesis of acute hemorrhagic or necrotic pancreatitis.

### BACTERIOLOGY

Ivan Procter, M.D.

(Answer any six questions.)

I. Name five diseases in which the etiological agent or its products are commonly demonstrated in the blood stream, giving name of the agent and stage of the disease during which this demonstration is best accomplished.
II. Give the specific laboratory differentiation of the pathogenic organisms within each of the following groups:
   (1) Enteric bacteria
   (2) Pneumococci
   (3) Staphylococci
   (4) Streptococci
III. Name three members of the Clostridium group of organisms and also the diseases for which they may be responsible. List some characteristics of the respective species by means of which they may be identified in the laboratory.
IV. (1) What methods are available for skin testing when tuberculosis is suspected?
   (2) What is the significance of a positive skin test?
V. What are Koch's postulates?
   To what extent have they been fulfilled in:
   (1) Poliomyelitis
   (2) Gonorrhea
   (3) Tuberculosis
   (4) Murine typhus

VI. Give the scientific name and general characteristics of the specific organism in each of five different venereal diseases and name the laboratory tests for each.

VII. In a family composed of an asthmatic father, mother, 1-year-old infant, and 12-year-old schoolboy with suspected diphtheria, state how the clinical diagnosis may be substantiated in the laboratory and how the physician or health officer should handle this situation.

### OBSTETRICS AND GYNECOLOGY

Thomas Leslie Lee, M.D.

1. (a) Name the etiological factors in antepartum hemorrhage.
   (b) Name three causes of postpartum hemorrhage.
2. Discuss the etiology, diagnosis and treatment of rupture of the uterus during labor.
3. (a) Name the four types of pelves according to variation in shape which may be encountered in the female pelvis of normal dimensions.
   (b) By what method can these variations be most readily studied in the patient?
4. Describe your treatment during labor and your method of delivery of a nulliparous patient with adequate pelvis and an occipitoposterior position.
5. Name the studies necessary in a female patient who is potentially sterile.
6. Name four ways in which endometrial or misplaced muellerian tissue may reach its ectopic location. (This refers to endometriosis.)
7. Discuss in detail the diagnosis and treatment of adenocarcinoma of the fundus of the uterus.
8. Discuss the diagnosis and treatment of (1) cervical polyps, (2) endocervicitis with erosion. What is their relation to malignancy?

### PHARMACOLOGY, PEDIATRICS AND PUBLIC HEALTH

Charles W. Armstrong, M.D.

### PUBLIC HEALTH

(Answer question No. 1, and either No. 2 or No. 3.)

1. Fill out the attached birth and death certificates.
2. What is meant by an **immune reaction** to smallpox vaccine?
3. What is the approximate duration of immunity conferred by administration of **diphtheria antitoxin?**

### PEDIATRICS

(Answer any two questions.)

1. At what age should a child be immunized against the following diseases:
   Whooping cough, tetanus, smallpox, scarlet fever, diphtheria, Rocky Mountain spotted fever, malaria, typhus fever, acute anterior poliomyelitis?
2. How might you protect a child against measles by inoculation?
   What is the product used?
   Briefly discuss method and how you might produce an active or passive immunity.
3. Outline briefly the treatment for third degree pes planus in a 3-year-old child.

### PHARMACOLOGY

(Answer any two questions.)

1. Of what value is streptomycin in the treatment of tuberculosis?
2. What is British Anti-Lewisite (BAL) and for what is it used?
3. What is a narcotic?
   List all drugs for which a prescription is required in North Carolina.

### PRACTICE OF MEDICINE AND THERAPEUTICS

Paul G. Parker, M.D.

1. Give symptoms and diagnosis of general paresis.
2. What is agranulocytosis? Discuss its causes.
3. What is Raynaud's disease? Give differential diagnosis.
4. Give differential diagnosis between coronary occlusion and ruptured gastric ulcer.
5. Give symptoms, signs, and sequelae of acute hepatitis.
6. Give differential diagnosis of chicken-pox and small-pox.
7. Discuss the recognized clinical syndromes of deficiency of the various vitamin B factors.
8. Explain emetic action of:
   (1) Ipecac
   (2) Digitalis
   (3) Apomorphine hydrochloride
9. What are the therapeutic uses of aminophyllin?
10. Name two anti-coagulant drugs. Discuss indications for their use, the method of administration, and precautions required for safety.
11. Describe and briefly explain the effects of insulin on metabolism.
12. Name two pure compounds, chemically unrelated to each other, that can diminish hyperactivity of the thyroid gland.

(Answer five out of first six questions, and five out of remaining six questions.)

### SURGERY

R. B. McKnight, M.D.

(Answer any five questions. Answers must be explicit and to the point. Do not describe any surgical technique.)

1. What chemical and x-ray studies should be made in cases of rapidly repeated formation of renal calculi? Why?
2. Discuss the differential diagnosis in suspected appendicitis in a 6-year-old child.
3. Should none, some or all patients with nontoxic nodular goiter be operated upon? Give specific reasons for your answer.
4. What is the etiology of gas gangrene? Describe the lesion. Give an outline of prevention and treatment.
5. Discuss the pathologic physiology and management of traumatic shock.
6. Give the etiology, pathology and treatment of bursitis of the shoulder.

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## NEWS NOTES FROM THE OFFICE OF THE SURGEON GENERAL

### Army Engineers to Build Greatest Medical Center

What is planned to be the greatest medical research center in the world will be built at Forest Glen, Maryland, by the Corps of Engineers for the Office of the Surgeon General, according to a recent announcement made by Major General Raymond W. Bliss, the Surgeon General. In keeping with technological advances in all fields, based on experiences in the late war, the center will be equipped to anticipate and meet the medical problems of the future as well as to cope with those of the present. The initial cost is estimated at approximately $40,000,000. Construction will be supervised by the District Engineer, Washington, D. C. Engineer District.

Officially designated as the "Army Medical Research and Graduate Teaching Center," the project will consist of a 1,000-bed general hospital, capable of expansion to 1,500 beds; the Army Institute of Pathology building; the Army Medical Museum and Center Administration building; Central Laboratory Group buildings; and the Army Institute of Medicine and Surgery. A working library, animal farm, quarters for the staff and other buildings are included in the plans.

* * * *

### Discharge of Medical Officers Liberalized

The War Department announced recently a streamlining of discharge criteria for all Medical Department officers effective July 1. All non-volunteer doctors, dentists, dietitians, Veterinary and Sanitary Corps officers will be eligible for separation upon completion of two years' service. Nurses, physical therapists, and officers of the Medical Administrative Corps except those who have volunteered for extended active duty will be eligible for immediate separation.

Critically needed medical officers can still be individually retained where it is essential for the proper care of patients, the announcement stated. At present there are thirty-six specialists being retained as essential in Army hospitals.

## U. S. PUBLIC HEALTH SERVICE

Dr. R. R. Sayers, medical director, U. S. Public Health Service, and director of U. S. Bureau of Mines since 1940, has been granted leave without pay to accept the chairmanship of the medical board established recently by the Trustees of the Welfare and Retirement Fund of the United Mine Workers of America. His appointment was announced by Dr. Thomas Parran, Surgeon General, U. S. Public Health Service.

* * * *

Construction of 225 million dollars' worth of hospital and health facilities during the fiscal year of 1948, ending June 30 next year, will be possible under the appropriations act signed by the President on July 8, Thomas Parran, Surgeon General, U. S. Public Health Service, Federal Security Agency, announced. So far three state construction plans have been approved and it is expected that more than half of the states will have submitted their plans by fall. The states whose plans have been approved are Indiana, Mississippi and North Carolina.

## DR. CLOWES HONORED

Dr. G. H. A. Clowes, Ph.D., Sc.D., LL.D., Director Emeritus of the Lilly Research Laboratories, was honored by the American Diabetes Association at its recent annual meeting in Atlantic City, New Jersey. He delivered the annual Banting Memorial address and was awarded the Banting Medal which is given in recognition of distinguished service in the field of diabetes.

Under Dr. Clowes' direction, the Lilly Research Laboratories cooperated with the University of Toronto and Drs. Banting and Best in the early development of insulin of sufficient purity and stability to permit its widespread clinical use throughout the world.

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Year round private home and school for girls and boys of any age on pleasant 150 acre farm near Charlottesville.
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DR. M. J. L. HOYE, Supt.

*Fellow of the American Psychiatric Association*

# BOOK REVIEWS

**Gynecological and Obstetrical Pathology With Clinical and Endocrine Relations.** By Emil Novak, M.D., D.Sc. (Hon. Dublin), F.A.C.S., Assoc. in Gyn., Johns Hopkins Med. Sch.; Gynecologist, Bon Secours and St. Agnes Hospitals, Baltimore. Ed. 2, with 542 illustrations, 15 in color. 570 pages. Price, $7.50. Philadelphia and London: W. B. Saunders Company, 1947.

In the second edition of this book Dr. Novak has brought up to date one of the outstanding monographs in the field of pathology. Over one hundred new illustrations have been added, including a considerable group in color. In this book the student and physician will find readily accessible the pertinent facts regarding gynecologic and obstetric pathology. It is recommended to all physicians who treat pelvic disorders of the female.

---

**Skin Disease, Nutrition and Metabolism.** By Erich Urbach, M.D., F.A.C.A., Associate in Dermatology, University of Pennsylvania School of Medicine; with the collaboration of Edward B. LeWinn, M.D., F.A.C.P., Associate in Medicine, Jewish Hospital, Philadelphia. 634 pages, with 266 illustrations. Price, $10.00. New York: Grune & Stratton, 1946.

This book represents a very laudable attempt to focus the attention of dermatologists on the metabolic aspects of skin conditions. The most important contribution, in this reviewer's opinion, is the abandonment of the conventional classification of the dermatoses by appearance and an attempt to group them by biochemical similarity. This departure may be illustrated by the five sections into which the text is divided: (1) the influence of nutrition on the physiology of the skin; (2) nutritional causes of dermatoses; (3) influence of diseases of the gastro-intestinal tract, liver, and pancreas on the skin; (4) nutritional therapy of skin diseases; and (5) nutritional tables.

The text statements are well documented, 1,314 references to the literature being cited. The criticism may be offered that it is difficult to discriminate in the text between the discussion of established facts and the presentation of theoretical material.

Because of its somewhat limited field, and the fact that therapeutic measures other than diet are not discussed, it is felt that this monograph would be of only limited usefulness to medical students, but should be of considerable interest to dermatologists and internists, and could become a useful reference work for investigators in the field of metabolic diseases in general.

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**The Diagnosis and Treatment of Diarrheal Diseases.** By William Z. Fradkin, M.D., Assistant Attending Gastroenterologist, Jewish Hospital, Brooklyn. 254 pages. Price, $6.00. New York: Grune & Stratton, Inc., 1947.

This book represents an effort on the part of the author to condense into a short, practical presentation the diagnosis and treatment of all the various types of diarrheal diseases. The first sixty pages consist of an introduction to the general considerations of diarrhea, with chapters on the anatomic and pathologic changes, the disturbances of phsiology and chemistry, bacteriologic studies, and diagnostic aids.

In the remainder of the book specific diseases causing diarrhea are discussed. The author emphasizes the scope of the general problem and stresses the importance of diarrhea as a manifestation of many types of disease. There are numerous good illustrations. Unfortunately, because of the large amount of material which he attempts to include, the space allotted to some of the more frequent clinical entities is far from adequate, and the actual distribution of the material is in some sections disproportionate. This drawback is, however, partially compensated by a good bibliography.

---

**Rehabilitation Through Better Nutrition—** University of Cincinnati Studies in Nutrition at the Hillman Hospital, Birmingham, Alabama. By Tom D. Spies, M.D., from the Department of Internal Medicine, University of Cincinnati College of Medicine. 94 pages, 50 figures. Price, $4.00. Philadelphia and London: W. B. Saunders Company, 1947.

This monograph represents the author's experience in the therapeutic application of principles of nutrition evolved in the nutrition study at Birmingham. The diagnostic criteria of B-complex deficiencies as well as those of vitamins A and C are defined and illustrated, and the actual complaints and physical findings in the patients studied are stressed. Brief mention is also made of pernicious anemia, nutritional anemia, sprue, and protein deficiencies. Illustrative case reports are included.

Emphasis is placed on the sociologic and economic importance of rehabilitating these patients rather than on the general subjects of the prevention and therapy of deficiency diseases. The importance of correct diagnosis and complete therapy for rehabilitation, and the prompt and satisfactory response of such persons to adequate treatment are noted.

This monograph is of interest in providing a small cross section of a large and important study.

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## TWENTIETH ANNIVERSARY YEAR OF HAROFE HAIVRI

### The Hebrew Medical Journal

The attention of the medical profession is directed to the appearance of the spring issue of **Harofe Haivri** (The Hebrew Medical Journal), a semi-annual bilingual publication edited by Dr. Moses Einhorn. This issue, Volume I, 1947, inaugurates the twentieth anniversary year, and in his editorial Dr. Einhorn discusses in detail the aims and growth of the Journal through the years.

The original articles are summarized in English to make them available to those who are unable to read Hebrew. For further information, communicate with the editorial office of **The Hebrew Medical Journal**, 983 Park Avenue, New York 28, N. Y.

# TRANSACTIONS

OF THE

# MEDICAL SOCIETY

OF THE STATE OF NORTH CAROLINA

## NINETY-THIRD ANNUAL SESSION

...held at...

VIRGINIA BEACH, VIRGINIA

MAY 12, 13 and 14, 1947

**President, William M. Coppridge, M. D., Durham**

**Secretary-Treasurer, Roscoe D. McMillan, M. D., Red Springs**

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EARLY HISTORY OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA FROM ORGANIZATION TO 1804

| Date | Place | President | Vice Presidents | Corresponding Secretary | Secretary | Recording Secretary | Treasurer | Censors |
|---|---|---|---|---|---|---|---|---|
| Dec. 17, 1799, or April 16, 1800 | Raleigh | Richard Fenner | Nathaniel Loomis<br>John Claiborne | Calvin Jones | | Wm. B. Hill | Cargill Massenburg | Sterling Wheaton<br>James Webb<br>Jas. John Pasteur<br>Jason Hand |
| Dec. 1, 1800 | Raleigh | Richard Fenner | | | Sterling Wheaton | | | |
| Dec. 1, 1801 | Raleigh | John C. Osborne | Thomas Mitchell<br>Richard Fenner | Calvin Jones | Sterling Wheaton | | Cargill Massenburg | James Webb<br>John Sibley |
| 1802 | Raleigh | John C. Osborne | | Calvin Jones | | | | |
| 1803 | Raleigh | John C. Osborne | | Calvin Jones | | | | |
| 1804 | Raleigh | John C. Osborne | | Calvin Jones | | | | |

HISTORY OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA FROM 1849 TO 1947
*Missing Data Not to be Found in Record

| | Date | Place of Meeting | Number in Attendance | President | Vice Presidents* | Secretary | Treasurer* | Members on Roll* | Honorary Members* | Honorary Fellows* |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1849 | Raleigh | 25 | F. J. Hill | | W. H. McKee | | 25 | | |
| 1 | 1850 | Raleigh | 21 | E. Strudwick | F. J. Haywood, C. E. Johnson, J. E. Williamson, W. G. Thomas | W. H. McKee | W. G. Hill | 38 | 9 | |
| 2 | 1851 | Raleigh | 23 | E. Strudwick | C. E. Johnson | W. H. McKee | W. G. Hill | 46 | 0 | |
| 3 | 1852 | Wilmington | 38 | J. E. Williamson | Thomas N. Cameron, William G. Hill, Johnston B. Jones, N. J. Pittman | E. B. Haywood | J. J. W. Tucker | 72 | 12 | |
| 4 | 1853 | Fayetteville | 24 | J. E. Williamson | William G. Hill, Johnston B. Jones, J. B. G. Myers, N. J. Pittman | W. W. Harris | Daniel Dupree | 80 | 14 | |
| 5 | 1854 | Raleigh | 37 | J. H. Dickson | N. J. Pittman, J. B. G. Myers, J. Graham Tull, A. D. McLean | S. S. Satchwell | Daniel Dupree | 84 | 17 | |
| 6 | 1855 | Salisbury | 23 | J. H. Dickson | J. Graham Tull, Owen Hadley, A. D. McLean, Hugh Kelly | S. S. Satchwell | J. B. Dunn | 96 | 18 | |
| 7 | 1856 | Raleigh | 35 | C. E. Johnson | Marcellus Whitehead, E. R. Gibson, Johnston B. Jones, O. F. Manson | S. S. Satchwell | J. B. Dunn | 101 | 22 | |
| 8 | 1857 | Edenton | 25 | C. E. Johnson | Marcellus Whitehead, O. F. Manson, H. W Faison, E. T. Gibson | W. G. Thomas | J. B. Dunn | 113 | 16 | |
| 9 | 1858 | New Bern | 69 | W. H. McKee | Edward Warren, C. W. Graham, Caleb Winslow, A. B. Pierce | W. G. Thomas | J. B. Dunn | 172 | 18 | |
| 10 | 1859 | Statesville | 81 | W. H. McKee | James G. Ramsey, P. E. Hines, J. R. Mercer, W. T. Howard | W. G. Thomas | C. W. Graham | | | |
| 11 | 1860 | Washington | 64 | N. J. Pittman | P. T. Henry, R. H. Winborne, M. Whitehead, T. S. Leach | W. G. Thomas | C. W. Graham | 233 | 18 | |
| 12 | 1861 | Morganton | 23 | N. J. Pittman | J. J. Summerell, C. T. Murphy, G. W. Hodges, W. A. B. Norcom | W. G. Thomas | C. W. Graham | 244 | 18 | |
| 13 | 1866 | Raleigh | 20 | J. J. Summerell | E. Burke Haywood, R. H. Winborne, W. L. Barrow, J. W. Jones | W. G. Thomas | C. W. Graham | | | |
| 14 | 1867 | Tarboro | 41 | W. G. Thomas | | S. S. Satchwell | C. W. Graham | 288 | 11 | |
| 15 | 1868 | Warrenton | 27 | S. S. Satchwell | Hugh Kelly, George A. Foote, Charles J. O'Hagan, J. H. Baker | Thomas F. Wood | J. W. Jones | | | |
| 16 | 1869 | Salisbury | 36 | E. B. Haywood | Thomas E. Wilson, A. B. Pierce, C. T. Murphy, M. A. Locke | Thomas F. Wood | J. W. Jones | | | |
| 17 | 1870 | Wilmington | 38 | C. J. O'Hagan | E. A. Anderson, F. N. Luckey, W. R. Sharpe, R. L. Payne | Thomas F. Wood | J. W. Jones | | | |
| 18 | 1871 | Raleigh | 35 | Hugh Kelley | D. N. Patterson, R. C. Pearson, J. B. Seavy, G. L. Kirby | Thomas F. Wood | J. W. Jones | | | |
| 19 | 1872 | New Bern | 34 | W. G. Hill | H. W. Faison, R. I. Hicks, G. H. Macon, W. A. B. Norcom | James McKee | J. W. Jones | | | |
| 20 | 1873 | Statesville | 43 | M. Whitehead | W. T. Ennett, William Little, Charles Duffy, P. T. Jerman | James McKee | H. T. Bahnson | | | |
| 21 | 1874 | Charlotte | 56 | W. A. B. Norcom | J. B. Jones, R. F. Lewis, C. G. Cox, J. L. Knight | James McKee | H. T. Bahnson | | | |
| 22 | 1875 | Wilson | 60 | J. W. Jones | Walker Debnam, J. A. Gibson, William Little, D. N. Patterson | James McKee | H. T. Bahnson | 148 | 5 | |
| 23 | 1876 | Fayetteville | 33 | Peter E. Hines | J. H. Baker, G. G. Smith, T. D. Haigh, J. K. Hall | James McKee | H. T. Bahnson | 157 | 4 | |
| 24 | 1877 | Salem | 42 | George A. Foote | J. K. Hall, B. W. Robinson, A. Holmes, A. A. Hill | James McKee | A. G. Carr | 177 | 4 | |
| 25 | 1878 | Goldsboro | 79 | R. L. Payne | E. M. Rountree, Richard Anderson, S. B. Flowers, L. A. Stith | L. J. Picot | A. G. Carr | 194 | 6 | |
| 26 | 1879 | Greensboro | 109 | Chas. Duffy, Jr. | J. A. Gibson, Willis Alston, James McKee, A. A. Hill | L. J. Picot | A. G. Carr | 198 | 6 | |
| 27 | 1880 | Wilmington | 105 | J. F. Shaffner | J. K. Hall, W. C. McDuffie, W. R. Wilson, R. F. Lewis | L. J. Picot | A. G. Carr | 225 | 6 | |
| 28 | 1881 | Asheville | 92 | R. B. Haywood | J. E. McRee, W. H. Lilly, R. H. Speight, W. J. H. Bellamy | L. J. Picot | A. G. Carr | 254 | 6 | |
| 29 | 1882 | Concord | 65 | Thos. F. Wood | T. J. Moore, D. J. Cain, S. E. Evans, John McDonald | L. J. Picot | A. G. Carr | 297 | 7 | |
| 30 | 1883 | Tarboro | 112 | J. K. Hall | A. W. Knox, J. M. Hadley, E. S. Foster, John Whitehead | L. J. Picot | A. G. Carr | 310 | 7 | |
| 31 | 1884 | Raleigh | 112 | A. B. Pierce | F. W. Potter, G. W. Graham, R. Dillard, G. W. Long | L. J. Picot | A. G. Carr | 348 | 7 | |
| 32 | 1885 | Durham | 173 | W. C. McDuffie | James McKee, T. E. Anderson, W. H. Whitehead, A. G. Carr | W. C. Murphy | R. L. Payne, Jr. | 424 | 6 | |

HISTORY OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA FROM 1849 TO 1947—Continued
*Missing Data Not to be Found in Record

| Date | | Place of Meeting | Number in Attendance | President | Vice Presidents | Secretary | Treasurer | Members on Roll | Honorary Members | Honorary Fellows* |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | 1886 | New Bern | 113 | Joseph Graham | H. T. Bahnson, L. J. Picot, J. L. McMillan, W. W. Faison | J. M. Baker | R. L. Payne, Jr. | 438 | 7 | ------ |
| 34 | 1887 | Charlotte | 112 | H. T. Bahnson | G. G. Smith, J. L. Nicholson, C. M. Van Poole, H. B. Ferguson | J. M. Baker | R. L. Payne, Jr. | 452 | 7 | ------ |
| 35 | 1888 | Fayetteville | 133 | T. D. Haigh | W. T. Ennett, J. A. Dunn, T. E. Anderson | J. M. Baker | C. M. Van Poole | 306 | 6 | ------ |
| 36 | 1889 | Elizabeth City | 50 | W. T. Ennett | W. J. Jones, S. W. Stevenson, G. W. Long | J. M. Baker | C. M. Van Poole | 410 | 6 | ------ |
| 37 | 1890 | Oxford | 160 | G. G. Thomas | R. L. Payne, Jr., Richard Dillard, S. D. Booth | J. M. Hays | C. M. Van Poole | 414 | 6 | ------ |
| 38 | 1891 | Asheville | 135 | R. H. Lewis | S. W. Battle, J. L. Nicholson, W. H. Lilly | J. M. Hays | C. M. Van Poole | 422 | 6 | ------ |
| 39 | 1892 | Wilmington | 162 | W. T. Cheatham | T. S. Burbank, J. W. Long, W. H. H. Cobb, W. D. Hilliard | J. M. Hays | C. M. Van Poole | 431 | 6 | ------ |
| 40 | 1893 | Raleigh | 221 | J. W. McNeill | W. C. Galloway, H. H. Harris, J. M. Hadley, Thomas Hill | R. D. Jewett | M. P. Perry | 447 | 5 | 3 |
| 41 | 1894 | Greensboro | 166 | W. H. H. Cobb | J. A. Hodges, R. W. Tate, Willis Alston, M. H. Fletcher | R. D. Jewett | M. P. Perry | 454 | 5 | 3 |
| 42 | 1895 | Goldsboro | ----- | J. H. Tucker | J. Howell Way, W. H. Harrell, O. McMullan, C. A. Misenheimer | R. D. Jewett | M. P. Perry | 436 | 7 | 3 |
| 43 | 1896 | Winston-Salem | 158 | R. L. Payne | S. D. Booth, J. P. Munroe, J. A. Burroughs, J. E. Grimsley | R. D. Jewett | M. P. Perry | 452 | 7 | 3 |
| 44 | 1897 | Morehead City | 103 | P. L. Murphy | J. C. Walton, A. A. Kent, M. R. Adams, B. L. Long | R. D. Jewett | M. P. Perry | 406 | 6 | 3 |
| 45 | 1898 | Charlotte | * | Francis Duffy | E. C. Register, A. T. Cotton, J. H. B. Knight, F. H. Russell | R. D. Jewett | M. P. Perry | 437 | 6 | 21 |
| 46 | 1899 | Asheville | 152 | L. J. Picot | I. W. Faison, J. W. White, H. H. Dodson, W. C. Brownson | Geo. W. Presley | G. T. Sikes | 489 | 6 | 16 |
| 47 | 1900 | Tarboro | 115 | George W. Long | C. M. Van Poole, James M. Parrott, T. B. Williams, W. D. Hilliard | Geo. W. Presley | G. T. Sikes | 482 | 6 | 21 |
| 48 | 1901 | Durham | 186 | Julian M. Baker | M. H. Fletcher, C. A. Julian, D. A. Stanton, E. M. Summerell | Geo. W. Presley | G. T. Sikes | 515 | 5 | 18 |
| 49 | 1902 | Wilmington | 147 | Robert S. Young | A. G. Carr, E. D. Dixon-Carroll, I. M. Taylor, J. M. Parrott | Geo. W. Presley | G. T. Sikes | 546 | 5 | 20 |
| 50 | 1903 | Hot Springs | 155 | A. W. Knox | E. G. Moore, C. A. Julian, W. W. McKenzie, J. L. Nicholson | J. Howell Way | G. T. Sikes | 530 | 6 | 19 |
| 51 | 1904 | Raleigh | 326 | H. B. Weaver | John Hey Williams, John C. Rodman, S. F. Pfohl | J. Howell Way | G. T. Sikes | 1,033 | 8 | 17 |
| 52 | 1905 | Greensboro | 361 | David T. Tayloe | C. A. Julian, John T. Burrus, I. W. Faison | J. Howell Way | G. T. Sikes | 1,175 | 8 | 17 |
| 53 | 1906 | Charlotte | 406 | E. C. Register | L. B. McBrayer, W. H. Cobb, Jr., W. O. Spencer | J. Howell Way | G. T. Sikes | 1,234 | 8 | 16 |
| 54 | 1907 | Morehead City | 217 | Samuel D. Booth | C. M. Strong, J. E. McLaughlin, W. F. Hargrove | David A. Stanton | H. McK. Tucker | 888 | 7 | 16 |
| 55 | 1908 | Winston-Salem | 372 | J. Howell Way | J. E. Stokes, J. A. Turner, W. H. Dixon | David A. Stanton | H. McK. Tucker | 998 | 7 | 28 |
| 56 | 1909 | Asheville | 337 | J. F. Highsmith | C. M. Van Poole, D. A. Garrison, D. O. Dees | David A. Stanton | H. McK. Tucker | 1,067 | 7 | 25 |
| 57 | 1910 | Wrightsville Beach | 276 | J. A. Burroughs†<br>E. J. Wood | E. J. Wood, John Q. Myers, L. D. Wharton | David A. Stanon | H. D. Walker | 1,080 | 8 | 35 |
| 58 | 1911 | Charlotte | 412 | C. M. Van Poole | J. V. McGougan, W. E. Warren, L. N. Glenn | David A. Stanton | H. D. Walker | 880 | 8 | 45 |
| 59 | 1912 | Hendersonville | 296 | A. A. Kent | J. P. Monroe, W. P. Horton, J. G. Murphy | David A. Stanton | H. D. Walker | 950 | 8 | 44 |
| 60 | 1913 | Morehead City | 232 | J. P. Munroe | F. R. Harris, E. S. Bullock, L. B. Morse | John A. Ferrell | H. D. Walker | 1,133 | 8 | 40 |
| 61 | 1914 | Raleigh | 431 | J. M. Parrott | E. T. Dickinson, J. T. J. Battle, D. E. Sevier | John A. Ferrell | H. D. Walker | 1,228 | 8 | 47 |
| 62 | 1915 | Greensboro | 443 | L. B. McBrayer | J. J. Phillips, C. W. Moseley, S. M. Crowell | John A. Ferrell | H. D. Walker | 1,221 | 9 | 68 |
| 63 | 1916 | Durham | 406 | M. H. Fletcher | J. L. Nicholson, L. N. Glenn, W. H. Hardison | Benj. K. Hays | W. M. Jones | 1,228 | 10 | 79 |
| 64 | 1917 | Asheville | 280 | Charles O'H. Laughinghouse | D. J. Hill, J. L. Spruill, J. H. Shuford | Benj. K. Hays | W. M. Jones | 1,271 | 11 | 81 |
| 65 | 1918 | Pinehurst | 291 | I. W. Faison | Wm. deB. MacNider, Jos. B. Greene, Ben F. Royal | Benj. K. Hays | W. M. Jones | 1,087 | 11 | 81 |
| 66 | 1919 | Pinehurst | 335 | Cyrus Thompson | J. W. Halford, T. W. Davis, A. McN. Blair | Sec.-Treas.<br>Benj. K. Hays | Acting Sec.-Treas.<br>L. B. McBrayer | 1,306 | 11 | 100 |
| 67 | 1920 | Charlotte | 479 | C. V. Reynolds | H. D. Walker, F. Stanley Whitaker, Thos. I. Fox | Benj. K. Hays | L. B. McBrayer | 1,497 | 12 | 100 |
| 68 | 1921 | Pinehurst | 404 | T. E. Anderson | C. S. Lawrence, W. H. Ward, J. M. Manning | Benj. K. Hays | L. B. McBrayer | 1,491 | 12 | 93 |
| 69 | 1922 | Winston-Salem | 507 | H. A. Royster | W. T. Parrott, B. C. Nalle, J. R. McCracken | ------ | Sec.-Treas.<br>L. B. McBrayer | 1,571 | 12 | 100 |
| 70 | 1923 | Asheville | 356 | J. W. Long | F. M. Hanes, T. C. Johnson, B. L. Long | ------ | L. B. McBrayer | 1,592 | 9 | 101 |
| 71 | 1924 | Raleigh | 525 | J. V. McGougan | J. L. Spruill,‡ Eugene B. Glenn, D. A. Garrison | ------ | L. B. McBrayer | 1,604 | 9 | 106 |
| 72 | 1925 | Pinehurst | 550 | Albert Anderson | W. L. Dunn, A. E. Bell, K. G. Averitt | ------ | L. B. McBrayer | 1,657 | 10 | 116 |
| 73 | 1926 | Wrightsville Beach | 445 | Wm. deB. MacNider | J. P. Matheson, W. W. Dawson, H. H. Bass | ------ | L. B. McBrayer | 1,663 | 10 | 107 |
| 74 | 1927 | Durham | 653 | John Q. Myers | J. W. Carroll, A. Y. Linville, C. H. Cocke | ------ | L. B. McBrayer | 1,691 | 10 | 121 |
| 75 | 1928 | Pinehurst | 611 | John T. Burrus | G. H. Macon, R. F. Leinbach, W. R. Griffin | ------ | L. B. McBrayer | 1,738 | 11 | 143 |
| 76 | 1929 | Greensboro | 671 | Thurman D. Kitchin | W. L. Dunn,‡ Asheville, D. T. Tayloe, Jr., Washington, W. D. James, Hamlet | ------ | L. B. McBrayer | 1,666 | 11 | 146 |
| 77 | 1930 | Pinehurst | 701 | L. A. Crowell | W. B. Murphy, Wm. E. Warren, N. B. Adams | ------ | L. B. McBrayer | 1,711 | 11 | 155 |

## HISTORY OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA FROM 1849 TO 1947—Continued

| | Date | Place of Meeting | Number in Attendance | President | President-Elect | Vice Presidents | Sec.-Treas. | Members on Roll | Honorary Members | Honorary Fellows |
|---|---|---|---|---|---|---|---|---|---|---|
| 78 | 1931 | Durham | 714 | J. G. Murphy | M. L. Stevens | C. A. Julian, Greensboro<br>J. W. Davis, Statesville | L. B. McBrayer | 1,600 | 10 | 164 |
| 79 | 1932 | Winston-Salem | 740 | M. L. Stevens | Jno. B. Wright | C. W. Banner, Greensboro<br>W. W. Sawyer, Elizabeth City | L. B. McBrayer | 1,559 | 10 | 166 |
| 80 | 1933 | Raleigh | 714 | Jno. B. Wright | I. H. Manning | J. R. McCracken, Waynesville | L. B. McBrayer | 1,363 | 10 | 181 |
| 81 | 1934 | Pinehurst | 728 | I. H. Manning | P. P. McCain | W. G. Suiter, Weldon<br>R. L. Felts, Durham | L. B. McBrayer | 1,563 | 10 | 210 |
| 82 | 1935 | Pinehurst | 706 | P. P. McCain | Paul H Ringer | H. D. Walker, Elizabeth City<br>J. F. McKay, Buie's Creek<br>William Allan, Charlotte | L. B. McBrayer | 1,619 | 10 | 215 |
| 83 | 1936 | Asheville | 583 | Paul H. Ringer | C. F. Strosnider | J. K. Pepper, Winston-Salem<br>E. S. Bulluck, Wilmington | L. B. McBrayer | 1,462 | 10 | 235 |
| 84 | 1937 | Winston-Salem | 767 | C. F. Strosnider | Wingate M. Johnson | C. A. Woodward, Wilson<br>Jno. F. Brownsberger, Fletcher | L. B. McBrayer | 1,503 | 7 | 253 |
| 85 | 1938 | Pinehurst | 802 | Wingate M. Johnson | J. Buren Sidbury | R. B. McKnight, Charlotte<br>J. F. Abel, Waynesville | T. W. M. Long | 1,715 | 7 | 284 |
| 86 | 1939 | Cruise to Bermuda | 319 | J. Buren Sidbury | William Allan | C. B. Williams, Elizabeth City<br>M. D. Hill, Raleigh | T. W. M. Long | 1,605 | 8 | 313 |
| 87 | 1940 | Pinehurst | 835 | William Allan | Hubert B. Haywood | F. Webb Griffith, Asheville<br>Frank C. Smith, Charlotte | T. W. M. Long | 1,661 | 7 | 311 |
| 88 | 1941 | Pinehurst | 755 | Hubert B. Haywood | F. Webb Griffith | D. W. Holt, Greensboro<br>T. C. Kerns, Durham | T. W. M. Long (1)<br>I. H. Manning | 1,700 | 7 | 309 |
| 89 | 1942 | Charlotte | 710 | F. Webb Griffith | Donnell B. Cobb | Thos. DeL. Sparrow, Charlotte<br>T. L. Carter, Gatesville | Roscoe D. McMillan | 1,837 | 8 | 350 |
| 90 | 1943 | Raleigh | 736 | Donnell B. Cobb | James W. Vernon | George S. Coleman, Raleigh<br>Julian Moore, Asheville | Roscoe D. McMillan | 1,919 | 8 | 361 |
| 91 | 1944 | Pinehurst | 760 | James W. Vernon | Paul F. Whitaker | Fred C. Hubbard, North Wilkesboro<br>George L. Carrington, Burlington | Roscoe D. McMillan | 1,982 | 8 | 363 |
| | 1945 | No meeting because of O.D.T. restrictions | | Paul F. Whitaker | Oren Moore | Wm. H. Smith, Goldsboro<br>Zack D. Owens, Elizabeth City | Roscoe D. McMillan | 1,811 | 7 | 383 |
| 92 | 1946 | Pinehurst | 889 | Oren Moore | | Wm. H. Smith, Goldsboro‡<br>Zack D. Owens, Elizabeth City | Roscoe D. McMillan | 1,939 | 6 | 397 |
| 93 | 1947 | Virginia Beach, Va. | 444 | Wm. M. Coppridge | Frank A. Sharpe | G. E. Bell, Wilson<br>J. B. Bullitt, Chapel Hill | Roscoe D. McMillan | 2,191 | 7 | 407 |

†Died during his term of office; succeeded by E. J. Wood, first vice president. ‡Died during term of office. (1) Died during term of office; succeeded by I. H. Manning.

## STATUS OF SOCIETY MEMBERSHIP BY COUNTIES FOR YEARS 1930-1947

| COUNTY | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alamance-Caswell | 33 | 33 | 32 | 29 | 32 | 30 | 31 | 30 | 27 | 34 | 35 | 35 | 42 | 41 | 43 | 38 | 43 | 36 |
| Alexander 1 | | | | | | | | | | | | | | | | | | |
| Alleghany 2 | | | | | | | | | | | | | | | | | | |
| Anson | 6 | 6 | 4 | 4 | 9 | 7 | 8 | 7 | 6 | 11 | 10 | 10 | 9 | 10 | 9 | 9 | 9 | 10 |
| Ashe 3 | 5 | 5 | 4 | | | 7 | | | | | | | | | | | | |
| Ashe-Watauga | | | | | | | | | | | | | | | | | | 17 |
| Avery 4 | 5 | 5 | 5 | | 5 | 5 | 5 | 5 | 6 | 4 | 5 | 5 | 6 | 7 | 9 | 8 | 6 | 7 |
| Beaufort | 18 | 15 | 15 | 12 | 13 | 15 | 10 | 9 | 11 | 12 | 13 | 13 | 14 | 13 | 13 | 12 | 13 | 16 |
| Bertie | 7 | 9 | 7 | 8 | 9 | 11 | 9 | 8 | 8 | 7 | 7 | 7 | 8 | 7 | 8 | 6 | 6 | 8 |
| Bladen | 8 | 8 | 8 | 5 | 6 | 6 | 6 | | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Brunswick | 2 | 2 | 2 | 2 | 2 | 3 | 2 | | | | | | | | | | | |
| Buncombe | 113 | 112 | 105 | 83 | 107 | 115 | 106 | 98 | 103 | 111 | 108 | 90 | 97 | 115 | 128 | 121 | 124 | 145 |
| Burke | 17 | 17 | 17 | 17 | 12 | 10 | 13 | 18 | 17 | 18 | 22 | 22 | 21 | 23 | 25 | 8 | 24 | 32 |
| Cabarrus | 23 | 20 | 20 | 10 | 14 | 21 | 8 | 11 | 11 | 12 | 15 | 16 | 27 | 28 | 34 | 26 | 29 | 40 |
| Caldwell | 15 | 14 | 12 | 9 | 12 | 12 | 12 | 13 | 15 | 18 | 17 | 17 | 17 | 20 | 18 | 19 | 16 | 21 |
| Camden 5 | | | | | | | | | | | | | | | | | | |
| Carteret | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 10 | 2 | 3 | 2 | 4 | 6 | 6 | 8 | 4 | 9 | 11 |
| Caswell 6 | | | | | | 11 | | | | | | | | | | | | |
| Catawba | 13 | 13 | 16 | 8 | 16 | 16 | 16 | 14 | 19 | 19 | 15 | 13 | 21 | 19 | 24 | 11 | 23 | 25 |
| Chatham | 9 | 4 | 3 | 2 | 3 | 2 | 0 | 1 | 3 | 6 | 4 | 6 | 7 | 7 | 7 | 3 | 3 | 7 |
| Cherokee | 10 | 9 | 8 | 5 | 8 | 8 | 8 | 7 | 12 | 11 | 11 | 10 | 14 | 12 | 12 | 12 | 13 | 12 |
| Chowan-Perquimans | 8 | 6 | 7 | 6 | 7 | 5 | 4 | 2 | 5 | 5 | 3 | 5 | 7 | 7 | 5 | 5 | 9 | 11 |
| Clay 7 | | | | | | | | | | | | | | | | | | |
| Cleveland | 23 | 19 | 22 | 21 | 20 | 21 | 22 | 21 | 25 | 23 | 27 | 28 | 30 | 30 | 28 | 27 | 28 | 32 |
| Columbus | 15 | 10 | 8 | 8 | 10 | 11 | 10 | 7 | 9 | 16 | 18 | 15 | 17 | 18 | 18 | 32 | 15 | 22 |
| Craven | 13 | 13 | 14 | 9 | 5 | 10 | 6 | 6 | 8 | 7 | 7 | 11 | 12 | 14 | 10 | 11 | 14 | 14 |
| Cumberland | 26 | 23 | 21 | 27 | 27 | 27 | 21 | 24 | 24 | 22 | 22 | 13 | 27 | 25 | 27 | 13 | 25 | 29 |
| Currituck 8 | 1 | 1 | 1 | | | | | | | | | | | | | | | |
| Dare 5 | | | | | | | | | | | | | | | | | | |
| Davidson | 16 | 17 | 17 | 17 | 20 | 23 | 19 | 24 | 18 | 17 | 29 | 31 | 29 | 29 | 30 | 29 | 29 | 31 |
| Davie 9 | 5 | 5 | 6 | 4 | 2 | 1 | 1 | 1 | 4 | | | | | | | | | |
| Duplin | 9 | 11 | 7 | 2 | 2 | 9 | 2 | 2 | 4 | 2 | 4 | 10 | 12 | 7 | 11 | 6 | 9 | 13 |
| Durham-Orange | 67 | 76 | 77 | 76 | 76 | 85 | 87 | 81 | 104 | 110 | 119 | 127 | 128 | 135 | 139 | 138 | 133 | 152 |
| Edgecombe-Nash | 10 | 43 | 39 | 25 | 46 | 49 | 32 | 35 | 31 | 39 | 48 | 40 | 37 | 48 | 54 | 52 | 45 | 57 |
| Forsyth | 70 | 66 | 69 | 70 | 73 | 77 | 77 | 73 | 83 | 82 | 93 | 92 | 115 | 122 | 123 | 129 | 126 | 129 |
| Franklin | 10 | 9 | 7 | 7 | 9 | 8 | 9 | 9 | 6 | 3 | | 3 | 4 | 5 | 4 | 2 | 4 | 4 |
| Gaston | 36 | 33 | 37 | 12 | 28 | 30 | 21 | 28 | 38 | 35 | 35 | 41 | 48 | 44 | 43 | 18 | 28 | 42 |
| Gates | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| Graham | | | | | | | | | | | | | | | | | | |
| Granville | 13 | 13 | 12 | 10 | 10 | 11 | 10 | 11 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 12 | 14 | 13 |
| Greene | 5 | 5 | 5 | 5 | 6 | 5 | 6 | 6 | 7 | 6 | 5 | 6 | 7 | 6 | 6 | 6 | 6 | 4 |
| Guilford | 124 | 124 | 118 | 91 | 102 | 99 | 83 | 109 | 101 | 108 | 110 | 115 | 127 | 133 | 135 | 134 | 129 | 151 |
| Halifax | 16 | 15 | 14 | 13 | 15 | 18 | 17 | 25 | 23 | 23 | 24 | 21 | 26 | 26 | 25 | 25 | 22 | 23 |
| Harnett | 14 | 13 | 15 | 16 | 14 | 15 | 10 | 16 | 12 | 12 | 16 | 18 | 18 | 19 | 19 | 19 | 17 | 16 |
| Haywood | 14 | 12 | 13 | 15 | 20 | 19 | 21 | 22 | 21 | 21 | 21 | 19 | 21 | 20 | 20 | 19 | 16 | 21 |
| Henderson | 19 | 14 | 12 | 9 | 17 | 17 | 13 | 14 | 17 | 13 | 10 | 7 | 17 | 17 | 17 | 17 | 20 | 21 |
| Hertford | 5 | 5 | 5 | 6 | 7 | 7 | 4 | 5 | 7 | 3 | 1 | 6 | 6 | 8 | 8 | 2 | 6 | 6 |
| Hoke | 14 | 14 | 12 | 11 | 13 | 14 | 13 | 11 | 10 | 7 | 10 | 10 | 11 | 9 | 10 | 10 | 11 | 10 |
| Hyde | 1 | 1 | 1 | | 1 | 1 | | | | | | | | | | | | |
| Iredell-Alexander | 38 | 38 | 39 | 29 | 38 | 38 | 39 | 30 | 31 | 25 | 27 | 24 | 23 | 26 | 26 | 10 | 19 | 28 |
| Jackson 10 | 6 | 3 | 7 | 2 | 4 | 7 | 4 | 6 | 3 | 3 | 1 | 1 | 2 | 3 | 4 | 3 | 6 | |
| Jackson-Swain | | | | | | | | | | | | | | | | | | 8 |
| Johnston | 23 | 25 | 20 | 19 | 19 | 21 | 12 | 9 | 27 | 25 | 24 | 18 | 18 | 22 | 23 | 19 | 22 | 26 |
| Jones | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | | | | | | | | | |
| Lee | 13 | 11 | 13 | 10 | 10 | 10 | 3 | 8 | 10 | 9 | 10 | 11 | 12 | 11 | 12 | 12 | 13 | 13 |
| Lenoir | 22 | 17 | 19 | 20 | 22 | 20 | 22 | 21 | 22 | 21 | 25 | 24 | 26 | 27 | 27 | 12 | 25 | 29 |
| Lincoln | 13 | 10 | 12 | 12 | 13 | 11 | 8 | 10 | 11 | 11 | 11 | 14 | 15 | 15 | 14 | 10 | 15 | 14 |

STATUS OF MEMBERSHIP BY COUNTIES—Continued

| COUNTY | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Macon-Clay | 8 | 4 | 3 | 2 | 5 | 3 | 5 | 4 | 2 | 4 | 1 | 4 | 4 | 4 | 4 | 3 | 7 | 7 |
| Madison | 5 | 3 | 4 | 5 | 4 | 4 | 1 |  | 1 | 1 |  |  | 1 | 1 | 1 | 3 | 3 | 8 |
| Martin [11] | 8 | 7 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Martin-Washington-Tyrrell |  |  |  | 10 | 10 | 12 | 10 | 12 | 13 | 13 | 11 | 15 | 12 | 14 | 18 | 16 | 17 | 18 |
| McDowell | 12 | 10 | 10 | 11 | 10 | 13 | 10 | 6 | 10 | 12 | 13 | 14 | 13 | 12 | 13 | 13 | 15 | 14 |
| Mecklenburg | 128 | 124 | 117 | 104 | 108 | 116 | 116 | 125 | 119 | 119 | 130 | 138 | 127 | 131 | 142 | 150 | 161 | 175 |
| Mitchell [12] |  |  |  |  | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 4 |  |  |  |  |  |  |
| Mitchell-Avery [13] |  |  |  | 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mitchell-Watauga [14] | 6 | 5 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mitchell-Yancey |  |  |  |  |  |  |  |  |  |  |  |  | 7 | 5 | 7 | 3 | 5 | 7 |
| Montgomery | 9 | 10 | 9 | 7 | 9 | 9 | 8 | 7 | 3 | 6 | 4 | 5 | 6 | 5 | 4 | 2 | 4 | 4 |
| Moore | 17 | 21 | 21 | 18 | 22 | 21 | 19 | 22 | 21 | 20 | 19 | 17 | 22 | 21 | 21 | 20 | 22 | 23 |
| Nash [15] | 33 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| New Hanover | 38 | 37 | 35 | 25 | 35 | 39 | 34 | 36 | 32 | 39 | 37 | 38 | 43 | 44 | 45 | 40 | 49 | 55 |
| Northampton | 3 | 4 | 5 | 4 | 8 | 4 | 4 | 4 | 9 | 1 | 3 | 7 | 4 | 4 | 4 | 3 | 2 | 3 |
| Onslow | 5 | 5 | 6 | 6 | 6 | 5 | 2 | 5 | 4 | 4 | 3 | 5 | 8 | 8 | 8 | 8 | 8 | 10 |
| Orange [16] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pamlico | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 4 |
| Pasquotank-Camden-Currituck-Dare |  |  |  | 12 | 14 | 12 | 11 | 9 |  | 9 | 11 | 10 | 14 | 13 | 12 | 14 | 16 | 17 |
| Pasquotank-Camden-Dare [8] | 17 | 14 | 11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pender | 1 | 1 | 1 | 1 | 1 | 1 |  | 1 | 1 |  |  |  | 1 | 1 | 2 | 2 | 1 | 1 |
| Perquimans [17] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Person | 6 | 6 | 6 | 7 | 7 | 8 | 7 | 7 | 8 | 8 | 9 | 8 | 8 | 9 | 8 | 6 | 6 | 6 |
| Pitt | 27 | 27 | 20 | 14 | 22 | 26 | 24 | 26 | 30 | 29 | 28 | 25 | 29 | 30 | 31 | 32 | 30 | 31 |
| Polk | 6 | 5 | 7 | 7 | 6 | 6 | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 7 |
| Randolph | 8 | 7 | 14 | 10 | 11 | 13 | 10 | 9 | 11 | 11 | 13 | 12 | 12 | 13 | 14 | 5 | 16 | 20 |
| Richmond | 17 | 17 | 15 | 16 | 15 | 16 | 15 | 17 | 16 | 15 | 16 | 16 | 15 | 17 | 17 | 16 | 18 | 19 |
| Robeson | 24 | 21 | 22 | 23 | 25 | 27 | 28 | 29 | 34 | 33 | 35 | 35 | 35 | 36 | 38 | 38 | 38 | 40 |
| Rockingham | 24 | 24 | 21 | 22 | 23 | 21 | 18 | 20 | 18 | 22 | 22 | 26 | 24 | 29 | 29 | 25 | 29 | 29 |
| Rowan-Davie | 35 | 39 | 33 | 24 | 34 | 30 | 27 | 28 | 26 | 24 | 27 | 34 | 33 | 33 | 42 | 42 | 41 | 41 |
| Rutherford | 22 | 21 | 21 | 19 | 20 | 21 | 23 | 22 | 23 | 23 | 24 | 22 | 22 | 22 | 23 | 22 | 20 | 24 |
| Sampson | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 16 | 16 | 16 | 18 | 18 | 16 | 15 | 16 | 10 | 16 | 15 |
| Scotland | 10 | 11 | 11 | 11 | 11 | 11 | 10 | 11 | 11 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 9 | 12 |
| Stanly | 16 | 15 | 13 | 12 | 16 | 17 | 18 | 19 | 18 | 20 | 16 | 17 | 20 | 20 | 17 | 16 | 18 | 21 |
| Stokes | 2 | 6 | 6 | 1 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Surry [18] | 20 | 13 | 17 | 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Surry-Yadkin |  |  |  |  | 25 | 22 | 17 | 15 | 14 | 12 | 18 | 16 | 19 | 23 | 27 |  |  | 29 |
| Swain [10] |  |  |  |  | 3 |  | 4 | 5 | 3 | 3 |  | 2 | 3 | 3 | 2 | 2 | 2 |  |
| Transylvania | 2 | 2 | 1 | 3 | 2 | 2 | 2 |  | 2 | 3 | 1 | 7 | 8 | 10 | 9 | 7 | 7 | 6 |
| Tyrrell [19] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Union | 13 | 10 | 9 | 10 | 10 | 11 | 10 | 8 | 11 | 13 | 13 | 14 | 15 | 14 | 14 | 3 | 13 | 14 |
| Vance | 12 | 8 | 7 | 8 | 9 | 9 | 8 | 8 | 6 | 10 | 10 | 10 | 12 | 10 | 10 | 8 | 11 | 11 |
| Wake | 94 | 87 | 86 | 87 | 89 | 88 | 89 | 95 | 100 | 95 | 94 | 93 | 87 | 98 | 96 | 96 | 92 | 110 |
| Warren | 6 | 6 | 6 | 5 | 5 | 6 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 4 | 5 | 2 | 6 | 6 |
| Washington-Tyrrell [11] | 3 | 3 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Watauga [20] |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Watauga-Ashe [21] |  |  |  | 3 | 5 | 6 | 5 | 5 | 6 | 6 | 4 | 5 | 7 | 8 | 5 | 2 | 7 |  |
| Wayne | 38 | 30 | 32 | 22 | 27 | 29 | 27 | 29 | 30 | 31 | 34 | 33 | 35 | 38 | 38 | 37 | 37 | 38 |
| Wilkes [2] | 10 | 11 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wilkes-Alleghany |  |  |  | 9 | 13 | 10 | 14 | 13 | 14 | 15 | 13 | 16 | 17 | 17 | 17 | 14 | 16 | 17 |
| Wilson | 28 | 28 | 22 | 21 | 25 | 29 | 31 | 25 | 25 | 24 | 25 | 27 | 27 | 31 | 29 | 27 | 30 | 33 |
| Yadkin [18] | 10 |  | 4 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Yancey | 4 | 1 | 1 |  | 5 | 4 | 1 |  | 4 |  |  |  |  |  |  |  |  |  |
| Totals | 1,694 | 1,600 | 1,559 | 1,363 | 1,563 | 1,619 | 1,462 | 1,503 | 1,715 | 1,605 | 1,661 | 1,694 | 1,837 | 1,919 | 1,982 | 1,811 | 1,939 | 2,191 |

(1) See Iredell Alexander. (2) See Wilkes-Alleghany. (3) See Watauga-Ashe and Ashe-Watauga. (4) See Mitchell-Avery. (5) See Pasquotank-Camden-Dare and Pasquotank-Camden-Currituck-Dare. (6) See Alamance-Caswell. (7) See Macon-Clay. (8) See Pasquotank-Camden-Currituck-Dare. (9) See Rowan-Davie. (10) See Jackson-Swain. (11) See Martin-Washington-Tyrrell. (12) See Mitchell-Avery, Mitchell-Watauga, and Mitchell-Yancey. (13) See Avery and Mitchell. (14) See Mitchell, Watauga-Ashe, and Ashe-Watauga. (15) See Edgecombe-Nash. (16) See Durham-Orange. (17) See Chowan-Perquimans. (18) See Surry-Yadkin. (19) See Washington-Tyrrell and Martin-Washington-Tyrrell. (20) See Mitchell-Watauga, Watauga-Ashe, and Ashe-Watauga. (21) See Ashe-Watauga.

## ROSTER OF MEMBERS NORTH CAROLINA STATE BOARD OF HEALTH FROM ORGANIZATION IN 1877 TO 1944

| *Name* | *Address* | *Appointed by* | *Term* |
|---|---|---|---|
| S. S. Satchwell, M.D., President | Rocky Point | State Society | 1877 to 1878 |
| Thomas F. Wood, M.D., Secretary | Wilmington | State Society | 1877 to 1878 |
| Joseph Graham, M.D. | Charlotte | State Society | 1877 to 1878 |
| Charles Duffy, Jr., M.D. | New Bern | State Society | 1877 to 1878 |
| Peter E. Hines, M.D. | Raleigh | State Society | 1877 to 1878 |
| George A. Foote, M.D. | Warrenton | State Society | 1877 to 1878 |
| S. S. Satchwell, M.D., President | Rocky Point | State Society | 1878 to 1884 |
| Thomas F. Wood, M.D., Secretary | Wilmington | State Society | 1878 to 1884 |
| Charles J. O'Hagan, M.D., President | Greenville | State Society | 1878 to 1882 |
| George A. Foote, M.D. | Warrenton | State Society | 1878 to 1882 |
| Marcellus Whitehead, M.D. | Salisbury | State Society | 1878 to 1880 |
| R. L. Payne, M.D. | Lexington | State Society | 1878 to 1880 |
| H. G. Woodfin, M.D. | Franklin | Gov. Z. B. Vance | 1878 to 1880 |
| A. R. Ledeux, Chemist | Chapel Hill | Gov. Z. B. Vance | 1878 to 1880 |
| William Cain, Civil Engineer | Charlotte | Gov. Z. B. Vance | 1878 to 1880 |
| R. L. Payne, M.D. | Lexington | State Society | 1881 to 1887 |
| M. Whitehead, M.D., President | Salisbury | State Society | 1881 to 1884 |
| S. H. Lyle, M.D. | Franklin | Gov. T. J. Jarvis | 1881 to 1883 |
| William Cain, Civil Engineer | Charlotte | Gov. T. J. Jarvis | 1881 to 1883 |
| W. G. Simmons, Chemist | Wake Forest | Gov. T. J. Jarvis | 1881 to 1883 |
| J. W. Jones, M.D., President | Wake Forest | State Society | 1883 to 1889 |
| John McDonald, M.D. | Washington | State Society | 1883 to 1889 |
| S. H. Lyle, M.D. | Franklin | Gov. T. J. Jarvis | 1883 to 1885 |

| Name | Address | Appointed by | Term |
|---|---|---|---|
| W. G. Simmons, Chemist | Wake Forest | Gov. T. J. Jarvis | 1883 to 1885 |
| Arthur Winslow, Civil Engineer | Raleigh | Gov. T. J. Jarvis | 1884 to 1886 |
| R. H. Lewis, M.D. | Raleigh | State Board of Health | 1884 to 1886 |
| Thomas F. Wood, M.D., Secretary | Wilmington | State Society | 1885 to 1887 |
| William D. Hilliard, M.D. | Asheville | State Society | 1885 to 1891 |
| Arthur Winslow, Civil Engineer | Raleigh | Gov. A. M. Scales | 1885 to 1891 |
| W. G. Simmons, Chemist | Wake Forest | Gov. A. M. Scales | 1885 to 1887 |
| J. H. Tucker, M.D. | Henderson | Gov. A. M. Scales | 1885 to 1887 |
| R. H. Lewis, M.D., Secretary | Raleigh | State Society | 1887 to 1888 |
| H. T. Bahnson, M.D., President | Winston | State Society | 1887 to 1888 |
| Arthur Winslow, Civil Engineer | Raleigh | Gov. A. M. Scales | 1887 to 1889 |
| W. G. Simmons, Chemist | Wake Forest | Gov. A. M. Scales | 1887 to 1889 |
| J. H. Tucker, M.D. | Henderson | Gov. A. M. Scales | 1888 to 1891 |
| J. L. Ludlow, Civil Engineer | Winston | Gov. A. M. Scales | 1888 to 1891 |
| J. H. Tucker, M.D. | Henderson | Gov. D. G. Fowle | 1888 to 1891 |
| F. P. Venable, Ph.D., Chemist | Chapel Hill | Gov. D. G. Fowle | 1889 to 1893 |
| J. L. Ludlow, Civil Engineer | Winston | Gov. D. G. Fowle | 1889 to 1892 |
| J. A. Hodges, M.D. | Fayetteville | State Society | 1889 to 1893 |
| J. M. Baker, M.D. | Tarboro | State Society | 1891 to 1893 |
| J. H. Tucker, M.D. | Henderson | Gov. T. M. Holt | 1891 to 1893 |
| F. P. Venable, Ph.D., Chemist | Chapel Hill | Gov. T. M. Holt | 1891 to 1892 |
| J. L. Ludlow, Civil Engineer | Winston | Gov. T. M. Holt | 1892 to 1897 |
| Thomas F. Wood, M.D., Secretary† | Wilmington | State Society | 1891 to 1895 |
| George G. Thomas, M.D., President | Wilmington | State Board of Health | 1892 to 1895 |
| S. Westray Battle, M.D. | Asheville | State Society | 1893 to 1895 |
| W. H. Harrell, M.D. | Williamston | State Society | 1893 to 1895 |
| John Whitehead, M.D. | Salisbury | State Board of Health | 1893 to 1895 |
| W. H. G. Lucas | White Hall | Gov. Elias Carr | 1893 to 1895 |
| F. P. Venable, Ph.D., Chemist | Chapel Hill | Gov. Elias Carr | 1893 to 1895 |
| John C. Chase, Civil Engineer | Wilmington | Gov. Elias Carr | 1894 to 1897 |
| R. H. Lewis, M.D., Secretary | Raleigh | Gov. Elias Carr | 1895 to 1897 |
| W. P. Beall, M.D. | Greensboro | Gov. Elias Carr | 1895 to 1897 |
| W. J. Lumsden, M.D. | Elizabeth City | Gov. Elias Carr | 1895 to 1897 |
| John Whitehead, M.D. | Salisbury | State Society | 1895 to 1897 |
| W. H. Harrell, M.D. | Williamston | State Society | 1895 to 1897 |
| W. P. Beall, M.D. | Greensboro | Gov. Elias Carr | 1895 to 1897 |
| R. H. Lewis, M.D., Secretary | Raleigh | Gov. Elias Carr | 1897 to 1899 |
| F. P. Venable, Ph.D., Chemist | Chapel Hill | Gov. Elias Carr | 1897 to 1899 |
| John C. Chase, Civil Engineer | Wilmington | Gov. Elias Carr | 1897 to 1899 |
| Charles J. O'Hagan, M.D. | Greenville | Gov. D. L. Russell | 1897 to 1899 |
| John D. Spicer, M.D. | Goldsboro | Gov. D. L. Russell | 1897 to 1899 |
| J. L. Nicholson, M.D. | Richlands | Gov. D. L. Russell | 1899 to 1901 |
| R. H. Lewis, M.D., Secretary | Raleigh | Gov. D. L. Russell | 1899 to 1901 |
| A. W. Shaffer, Civil Engineer | Raleigh | Gov. D. L. Russell | 1899 to 1901 |
| Charles J. O'Hagan, M.D. | Greenville | Gov. D. L. Russell | 1899 to 1901 |
| J. L. Nicholson, M.D. | Richlands | Gov. D. L. Russell | 1899 to 1901 |
| Albert Anderson, M.D. | Wilson | Gov. D. L. Russell | 1899 to 1901 |
| George G. Thomas, M.D., President | Wilmington | State Society | 1899 to 1901 |
| S. Westray Battle, M.D. | Asheville | State Society | 1899 to 1901 |
| H. W. Lewis, M.D. | Jackson | State Society | 1899 to 1901 |
| H. H. Dodson, M.D. | Milton | State Society | 1901 to 1907 |
| R. H. Lewis, M.D., Secretary | Raleigh | Gov. C. B. Aycock | 1901 to 1907 |
| W. P. Ivey, M.D. | Lenoir | Gov. C. B. Aycock | 1901 to 1907 |
| George G. Thomas, M.D., President | Wilmington | Gov. C. B. Aycock | 1901 to 1905 |
| Francis Duffy, M.D. | New Bern | Gov. C. B. Aycock | 1901 to 1905 |
| J. L. Ludlow, Civil Engineer | Winston | Gov. C. B. Aycock | 1901 to 1905 |
| S. Westray Battle, M.D. | Asheville | State Society | 1901 to 1907 |
| H. W. Lewis, M.D. | Jackson | State Society | 1901 to 1907 |
| W. H. Whitehead, M.D. | Rocky Mount | State Society | 1901 to 1905 |
| J. L. Nicholson, M.D. | Richlands | State Society | 1901 to 1905 |
| J. L. Ludlow, Civil Engineer | Winston | Gov. C. B. Aycock | 1903 to 1909 |
| J. Howell Way, M.D. | Waynesville | Gov. R. B. Glenn | 1905 to 1911 |
| W. O. Spencer, M.D. | Winston | Gov. R. B. Glenn | 1905 to 1911 |
| George G. Thomas, M.D., President | Wilmington | State Society | 1905 to 1911 |
| Thomas E. Anderson, M.D. | Statesville | State Society | 1907 to 1913 |
| R. H. Lewis, M.D. | Raleigh | Gov. R. B. Glenn | 1907 to 1913 |
| E. C. Register, M.D. | Charlotte | Gov. R. B. Glenn | 1907 to 1909 |
| David T. Tayloe, M.D. | Washington | State Society | 1907 to 1913 |
| James A. Burroughs, M.D.[1] | Asheville | State Society | 1909 to 1913 |
| J. E. Ashcraft, M.D. | Monroe | State Board of Health | 1909 to 1913 |
| J. L. Ludlow, Civil Engineer | Winston-Salem | Gov. W. W. Kitchin | 1911 to 1917 |
| J. Howell Way, M.D., President | Waynesville | Gov. W. W. Kitchin | 1911 to 1917 |
| W. O. Spencer, M.D. | Winston-Salem | Gov. W. W. Kitchin | 1911 to 1917 |
| Thomas E. Anderson, M.D. | Statesville | State Society | 1911 to 1917 |

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† Died in 1892, leaving a five-year unexpired term, which was filled by the Board.

[1] Died leaving unexpired term.

| *Name* | *Address* | *Appointed by* | *Term* |
|---|---|---|---|
| Charles O'H. Laughinghouse, M.D. | Greenville | State Society | 1913 to 1919 |
| R. H. Lewis, M.D. | Raleigh | Gov. Locke Craig | 1913 to 1919 |
| Edw. J. Wood, M.D. | Wilmington | Gov. Locke Craig | 1913 to 1915 |
| A. A. Kent, M.D.[2] | Lenoir | State Society | 1913 to 1919 |
| Cyrus Thompson, M.D. | Jacksonville | State Society | 1913 to 1919 |
| Fletcher R. Harris, M.D. | Henderson | State Board of Health | 1915 to 1921 |
| J. L. Ludlow, Civil Engineer | Winston-Salem | Gov. Locke Craig | 1917 to 1923 |
| J. Howell Way, M.D., President | Waynesville | Gov. T. W. Bickett | 1917 to 1923 |
| E. C. Register, M.D.[1] | Charlotte | Gov. T. W. Bickett | 1917 to 1923 |
| Thomas E. Anderson, M.D. | Statesville | State Society | 1917 to 1923 |
| Charles O'H. Laughinghouse, M.D. | Greenville | State Society | 1919 to 1923 |
| Fletcher R. Harris, M.D.[3] | Henderson | State Society | 1919 to 1923 |
| A. J. Crowell, M.D. | Charlotte | Gov. T. W. Bickett | 1921 to 1923 |
| Chas. E. Waddell, C.E.[4] | Asheville | Gov. C. Morrison | 1919 to 1925 |
| Cyrus Thompson, M.D. | Jacksonville | State Society | 1919 to 1925 |
| R. H. Lewis, M.D. | Raleigh | Gov. T. W. Bickett | 1923 to 1925 |
| E. J. Tucker, D.D.S. | Roxboro | Gov. T. W. Bickett | 1923 to 1929 |
| J. Howell Way, M.D., President | Waynesville | Gov. C. Morrison | 1923 to 1929 |
| A. J. Crowell, M.D. | Charlotte | Gov. C. Morrison | 1923 to 1927 |
| James P. Stowe, Ph.G. | Charlotte | Gov. C. Morrison | 1923 to 1925 |
| D. A. Stanton, M.D. | High Point | State Board of Health | 1923 to 1929 |
| Thomas E. Anderson, M.D. | Statesville | State Society | 1923 to 1926 |
| Charles O'H. Laughinghouse, M.D.[5] | Greenville | State Society | 1925 to 1931 |
| Cyrus Thompson, M.D.[1] | Jacksonville | State Society | 1925 to 1931 |
| D. A. Stanton, M.D. | High Point | State Society | 1925 to 1931 |
| R. H. Lewis, M.D.[1] | Raleigh | Gov. A. W. McLean | 1926 to 1931 |
| Jno. B. Wright, M.D.[6] | Raleigh | Gov. A. W. McLean | 1925 to 1931 |
| E. J. Tucker, D.D.S.[6] | Roxboro | Gov. A. W. McLean | 1926 to 1927 |
| W. S. Rankin, M.D.[4] | Charlotte | State Board of Health | 1927 to 1929 |
| L. E. McDaniel, M.D. | Jackson | State Board of Health | 1927 to 1929 |
| Chas C. Orr, M.D. | Asheville | Gov. A. W. McLean | 1929 to 1935 |
| Thomas E. Anderson, M.D.[6] | Statesville | State Society | 1929 to 1935 |
| L. E. McDaniel, M.D.[6] | Jackson | State Society | 1927 to 1933 |
| James P. Stowe, Ph.G.[6] | Charlotte | Gov. A. W. McLean | 1929 to 1935 |
| A. J. Crowell, M.D.[6] | Charlotte | Gov. O. Max Gardner | 1930 to 1931 |
| J. M. Parrott, M.D.[6] | Kinston | State Board of Health | 1929 to 1935 |
| Chas. C. Orr, M.D.[6] | Asheville | Gov. O. Max Gardner | 1931 to 1935 |
| J. M. Parrott, M.D.[5] | Kinston | State Society | 1931 to 1935 |
| C. V. Reynolds, M.D. | Asheville | State Society | 1931 to 1933 |
| L. B. Evans, M.D. | Windsor | State Society | 1931 to 1933 |
| S. D. Craig, M.D. | Winston-Salem | State Society | 1931 to 1933 |
| John T. Burrus, M.D. | High Point | Gov. O. Max Gardner | 1931 to 1933 |
| J. N. Johnson, D.D.S. | Goldsboro | Gov. O. Max Gardner | 1931 to 1933 |
| J. A. Goode, Ph.G. | Asheville | Gov. O. Max Gardner | 1931 to 1933 |
| H. L. Large, M.D. | Rocky Mount | Gov. O. Max Gardner | 1931 to 1935 |
| H. G. Baity, C.E. | Chapel Hill | Gov. O. Max Gardner | 1931 to 1935 |
| Grady G. Dixon, M.D.[7] | Ayden | Ex. Com. State Society | 1931 to 1932 |
| Grady G. Dixon, M.D.[7] | Ayden | State Society | 1932 to 1935 |
| S. D. Craig, M.D. | Winston-Salem | State Society | 1933 to 1937 |
| W. T. Rainey, M.D. | Fayetteville | State Society | 1933 to 1937 |
| J. N. Johnson, D.D.S. | Goldsboro | Gov. J. C. B. Ehringhaus | 1933 to 1937 |
| Hubert B. Haywood, M.D. | Raleigh | Gov. J. C. B. Ehringhaus | 1933 to 1937 |
| Jomes P. Stowe, Ph.G. | Charlotte | Gov. J. C. B. Ehringhaus | 1933 to 1937 |
| Grady G. Dixon, M.D. | Ayden | State Society | 1935 to 1939 |
| J. LaBruce Ward, M.D. | Asheville | State Society | 1935 to 1939 |
| H. Lee Large, M.D. | Rocky Mount | Gov. J. C. B. Ehringhaus | 1935 to 1939 |
| H. G. Baity, C.E. | Chapel Hill | Gov. J. C. B. Ehringhaus | 1935 to 1939 |
| J. N. Johnson, D.D.S. | Goldsboro | Gov. Clyde R. Hoey | 1937 to 1941 |
| Hubert B. Haywood, M.D. | Raleigh | Gov. Clyde R. Hoey | 1937 to 1941 |
| James P. Stowe, Ph.G. | Charlotte | Gov. Clyde R. Hoey | 1937 to 1941 |
| S. D. Craig, M.D. | Winston-Salem | State Society | 1937 to 1941 |
| W. T. Rainey, M.D. | Fayetteville | State Society | 1937 to 1941 |
| Grady G. Dixon, M.D. | Ayden | State Society | 1939 to 1943 |
| J. LaBruce Ward, M.D. | Asheville | State Society | 1939 to 1943 |
| H. Lee Large, M.D. | Rocky Mount | Gov. Clyde R. Hoey | 1939 to 1943 |
| H. G. Baity, Sc.D. | Chapel Hill | Gov. Clyde R. Hoey | 1939 to 1943 |
| C. C. Fordham, Jr., Ph.G.[8] | Greensboro | Gov. Clyde R. Hoey | 1940 to 1943 |
| S. D. Craig, M.D. | Winston-Salem | State Society | 1941 to 1945 |
| W. T. Rainey, M.D. | Fayetteville | State Society | 1941 to 1945 |
| Hubert B. Haywood, M.D. | Raleigh | Gov. J. Melville Broughton | 1941 to 1945 |

[2] Resigned to become member of General Assembly.

[3] Resigned to become Health Officer Vance County.

[4] Resigned.

[5] Resigned to become Secretary of State Board of Health.

[6] Term terminated on account of the reorganization of the State Board of Health by General Assembly.

[7] To fill vacancy caused by resignation of Dr. J. M. Parrott.

[8] To fill vacancy caused by the death of James P. Stowe, Ph.G.

| *Name* | *Address* | *Appointed by* | *Term* |
|---|---|---|---|
| J. N. Johnson, D.D.S. | Goldsboro | Gov. J. Melville Broughton | 1941 to 1945 |
| James O. Nolan, M.D. | Kannapolis | Gov. J. Melville Broughton | 1941 to 1945 |
| Grady G. Dixon, M.D. | Ayden | State Society | 1943 to 1947 |
| J. LaBruce Ward, M.D. | Asheville | State Society | 1943 to 1947 |
| H. Lee Large, M.D. | Rocky Mount | Gov. J. Melville Broughton | 1943 to 1947 |
| Larry I. Moore, Jr. | Wilson | Gov. J. Melville Broughton | 1943 to 1947 |
| S. D. Craig, M.D., Pres. | Winston-Salem | State Society | 1945 to 1949 |
| W. T. Rainey, M.D. | Fayetteville | State Society | 1945 to 1949 |
| Hubert B. Haywood, M.D. | Raleigh | Gov. R. Gregg Cherry | 1945 to 1949 |
| James O. Nolan, M.D. | Kannapolis | Gov. R. Gregg Cherry | 1945 to 1949 |
| Paul Jones, D.D.S.[9] | Farmville | Gov. R. Gregg Cherry | 1946 to 1949 |
| Jasper C. Jackson, Ph.G.[10] | Lumberton | Gov. R. Gregg Cherry | 1945 to 1947 |
| Grady G. Dixon, M.D. | Ayden | State Society | 1947 to 1951 |
| J. LaBruce Ward, M.D. | Asheville | State Society | 1947 to 1951 |

[9] To fill vacancy caused by resignation of J. N. Johnson, D.D.S.

[10] To fill vacancy caused by resignation of Larry I. Moore, Jr.

## ROSTER OF MEMBERS OF THE VARIOUS BOARDS OF MEDICAL EXAMINERS OF THE STATE OF NORTH CAROLINA

### FIRST BOARD

| | |
|---|---|
| James H. Dickson, Wilmington | 1859-1866 |
| Charles E. Johnson, Raleigh | 1859-1866 |
| Caleb Winslow, Hertford | 1859-1866 |
| Otis F. Manson, Townsville | 1859-1866 |
| William H. McKee, Raleigh | 1859-1866 |
| Christopher Happoldt, Morganton | 1859-1866 |
| J. Graham Tull, New Bern | 1859-1866 |
| Samuel T. Iredell, Secretary | 1859-1866 |

### SECOND BOARD

| | |
|---|---|
| N. J. Pittman, Tarboro | 1866-1872 |
| E. Burke Haywood, Raleigh | 1866-1872 |
| R. H. Winborne, Edenton | 1866-1872 |
| S. S. Satchwell, Rocky Point | 1866-1872 |
| J. J. Summerell, Salisbury | 1866-1872 |
| R. B. Haywood, Raleigh | 1866-1872 |
| M. Whitehead, Salisbury | 1866-1872 |
| J. F. Shaffner, Salem | 1866-1872 |
| William Little, Secretary | 1866-1872 |
| Thomas F. Wood, Secretary, Wilmington | 1867-1872 |

### THIRD BOARD

| | |
|---|---|
| Charles J. O'Hagan, Greenville | 1872-1878 |
| W. A. B. Norcom, Edenton | 1872-1878 |
| C. Tate Murphy, Clinton | 1872-1878 |
| George A. Foote, Warrenton | 1872-1878 |
| J. W. Jones, Tarboro | 1872-1878 |
| R. L. Payne, Lexington | 1872-1878 |
| Charles Duffy, Jr., Secretary, New Bern | 1872-1878 |

### FOURTH BOARD

| | |
|---|---|
| Peter E. Hines, Raleigh | 1878-1884 |
| Thomas D. Haigh, Fayetteville | 1878-1884 |
| George L. Kirby, Goldsboro | 1878-1884 |
| Thomas F. Wood, Wilmington | 1878-1884 |
| Joseph Graham, Charlotte | 1878-1884 |
| Robert I. Hicks, Williamston[1] | 1878-1880 |
| Richard H. Lewis, Raleigh[2] | 1880-1884 |
| Henry T. Bahnson, Secretary, Salem | 1878-1884 |

### FIFTH BOARD

| | |
|---|---|
| William R. Wood, Scotland Neck | 1884-1890 |
| Augustus W. Knox, Raleigh | 1884-1890 |
| Francis Duffy, New Bern | 1884-1890 |
| Patrick L. Murphy, Morganton | 1884-1890 |
| Willis Alston, Littleton | 1884-1890 |
| J. A. Reagan, Weaverville | 1884-1890 |
| W. J. H. Bellamy, Secretary, Wilmington | 1884-1890 |

### SIXTH AND SEVENTH BOARDS[3]

| | |
|---|---|
| R. L. Payne, Jr., Lexington | 1890-1892 |
| George W. Purefoy, Asheville | 1890-1892 |
| George G. Thomas, Wilmington | 1890-1894 |
| Robert S. Young, Concord | 1890-1894 |
| William H. Whitehead, Rocky Mount | 1890-1896 |
| George W. Long, Graham | 1890-1896 |
| L. J. Picot, Secretary, Littleton | 1890-1896 |
| Julian M. Baker, Tarboro | 1892-1898 |
| H. B. Weaver, Secretary, Asheville | 1892-1898 |
| J. M. Hays, Greensboro[4] | 1894-1897 |
| Kemp P. Battle, Jr., Raleigh[5] | 1897-1900 |
| Thomas S. Burbank, Wilmington[1] | 1894-1898 |
| Richard H. Whitehead, Chapel Hill[1] | 1896-1898 |
| William H. H. Cobb, Goldsboro[6] | 1898-1900 |
| J. Howell Way, Secretary, Waynesville[7] | 1898-1902 |
| David T. Tayloe, Washington | 1896-1902 |
| Thomas E. Anderson, Sec., Statesville | 1896-1902 |
| Albert Anderson, Wilson[8] | 1898-1902 |
| Edward C. Register, Charlotte[8] | 1898-1902 |
| Thomas S. McMullan, Hertford[8] | 1900-1902 |
| John C. Walton[8] | 1900-1902 |

### EIGHTH BOARD

| | |
|---|---|
| A. A. Kent, Lenoir | 1902-1908 |
| Charles O'H. Laughinghouse, Greenville | 1902-1908 |
| M. H. Fletcher, Asheville | 1902-1908 |
| James M. Parrott, Kinston | 1902-1908 |
| J. T. J. Battle, Greensboro | 1902-1908 |
| Frank H. Russell, Wilmington | 1902-1908 |
| George W. Pressly, Secretary, Charlotte[1] | 1902-1906 |
| G. T. Sikes, Secretary, Grissom[9] | 1906-1908 |

### NINTH BOARD

| | |
|---|---|
| Lewis B. McBrayer, Asheville | 1908-1914 |
| John C. Rodman, Washington | 1908-1914 |
| William W. McKenzie, Salisbury | 1908-1914 |
| Henry H. Dodson, Greensboro | 1908-1914 |
| John Bynum, Winston-Salem | 1908-1914 |
| J. L. Nicholson, Richlands | 1908-1914 |
| Benj. K. Hays, Secretary, Oxford | 1908-1914 |

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[1] Resigned before expiration of term.

[2] Elected for unexpired term of Dr. Hicks.

[3] In 1890 the Medical Society of the State of North Carolina adopted the plan of electing members of the Board in such a manner that the terms would expire at different intervals of two years. This practice was followed for twelve years, or until 1902, when the plan was abandoned; an equivalent of two terms of six years each. It is evident that the Society arranged to abandon the policy as early as 1898, as two members were elected for short terms, and two years later two other members were elected for still shorter terms. It is therefore impossible to separate the sixth and seventh Boards, since the membership was overlapping.

[4] Died before the expiration of his term.

[5] Elected to serve unexpired term of Dr. Hays.

[6] Elected to serve the unexpired term of Dr. Burbank.

[7] Elected to serve the unexpired term of Dr. Whitehead.

[8] Elected for short term expiring in 1902.

[9] Elected to serve the unexpired term of Dr. Pressly.

### TENTH BOARD

| | |
|---|---|
| Isaac M. Taylor, Morganton | 1914-1920 |
| John Q. Myers, Charlotte | 1914-1920 |
| Jacob F. Highsmith, Fayetteville | 1914-1920 |
| Martin L. Stevens, Asheville | 1914-1920 |
| Charles T. Harper, Wilmington[4] | 1914-1915 |
| Edwin G. Moore, Elm City[10] | 1915-1920 |
| John G. Blount, Washington[11] | 1914-1920 |
| Hubert A. Royster, Secretary, Raleigh | 1914--920 |

### ELEVENTH BOARD

| | |
|---|---|
| Lester A. Crowell, Lincolnton | 1920-1926 |
| William P. Holt, Duke | 1920-1926 |
| J. Gerald Murphy, Wilmington | 1920-1926 |
| Lucius N. Glenn, Gastonia | 1920-1926 |
| Clarence A. Shore, Raleigh | 1920-1926 |
| William M. Jones, Greensboro | 1920-1926 |
| Kemp P. B. Bonner, Sec., Morehead City | 1920-1926 |

### TWELFTH BOARD

| | |
|---|---|
| Paul H. Ringer, Asheville | 1926-1932 |
| W. Houston Moore, Wilmington | 1926-1932 |
| T. W. M. Long, Roanoke Rapids | 1926-1932 |
| W. W. Dawson, Grifton[4] | 1926-1930 |
| J. K. Pepper, Winston-Salem | 1926-1932 |
| Foy Roberson, Durham | 1926-1932 |
| John W. McConnell, Secretary, Davidson | 1926-1932 |
| David T. Tayloe, Jr., Washington[12] | 1930-1932 |

### THIRTEENTH BOARD

| | |
|---|---|
| Ben F. Royal, Morehead City | 1932-1938 |
| Benj. J. Lawrence, Secretary, Raleigh | 1932-1938 |
| F. Webb Griffith, Asheville | 1932-1938 |
| Hamilton W. McKay, Charlotte | 1932-1938 |
| J. W. Vernon, Morganton | 1932-1938 |
| W. H. Smith, Goldsboro | 1932-1938 |
| K. G. Averitt, Cedar Creek[4] | 1932-1936 |
| Roscoe D. McMillan, Red Springs[13] | 1936-1938 |

### FOURTEENTH BOARD

| | |
|---|---|
| Karl B. Pace, Greenville | 1938-1944 |
| William M. Coppridge, Durham | 1938-1944 |
| Frank A. Sharpe, Greensboro | 1938-1944 |
| Lewis W. Elias, Asheville[4] | 1938-1943 |
| J. Street Brewer, Roseboro | 1938-1944 |
| W. D. James, Secretary, Hamlet | 1938-1944 |
| L. A. Crowell, Jr., Lincolnton | 1938-1944 |
| John LaBruce Ward, Asheville[14] | 1943-1944 |

### FIFTEENTH BOARD

| | |
|---|---|
| C. W. Armstrong, Salisbury | 1944-1950 |
| M. D. Bonner, Jamestown | 1944-1950 |
| T. Leslie Lee, Kinston | 1944-1950 |
| Roy B. McKnight, Charlotte | 1944-1950 |
| Paul G. Parker, Erwin | 1944-1950 |
| M. A. Pittman, Wilson | 1944-1950 |
| Ivan M. Procter, Secretary, Raleigh | 1944-1950 |

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[10] Elected to serve the unexpired term of Dr. Harper.

[11] Died a few months before the expiration of his term; such a short time that the vacancy was not filled.

[12] Elected to serve unexpired term of Dr. W. W. Dawson.

[13] Elected to serve unexpired term of Dr. Averitt.

[14] Elected to serve unexpired term of Dr. Elias.

## MOORE COUNTY MEDICAL SOCIETY MEDAL

In 1927 the Moore County Medical Society kindly put up enough money, the interest from which would pay for a medal to be given for the best paper read before the meeting each year. No one is eligible to receive this medal except Fellows of the Medical Society of the State of North Carolina in good standing; no invited guest is allowed to compete.

Each Section Chairman selects a committee of three to pass on the best paper written in their section. These six papers are then turned over to the State Committee who pass on the best of the six papers, the winner in this instance to receive the medal. The following Fellows have been awarded this medal:

1928—Paul Pressly McCain, M.D. .......... Sanatorium
"The Diagnosis and Significance of Juvenile Tuberculosis"
(From Section on Pediatrics)

1929—A. B. Holmes, M.D. .......... Fairmont
"The Treatment of Uremia"
(From Section on Chemistry, Materia Medica and Therapeutics)

1930—C. T. Smith, M.D., and W. Bernard Kinlaw, M.D. .......... Rocky Mount
"The Clinical Consideration of Anaemia of Pregnancy and of Puerperium"
(From Section on Practice of Medicine)

1931—F. C. Smith, M.D. .......... Charlotte
"Practical Value of Perimetry in Intracranial Conditions; Case Reports" (tumors, vascular disease, toxemia, syphilis and trauma)
(From Section on Eye, Ear, Nose and Throat)

1932—Charles I. Allen, M.D. .......... Wadesboro
"An Improved Splint for Treating Fractures of the Lower Extremity Showing Reduction and Skeletal Distraction Attachments"
(From Section on Surgery)

1933—H. F. Sloan, M.D. .......... Charlotte
"Some General Remarks about Cataract Surgery, With Report of 100 Consecutive Uncomplicated Cataract Operations"
(From Section on Ophthalmology and Otolaryngology)
J. R. Adams, M.D. .......... Charlotte
"Hypo-glycaemia in Children"
(From Section on Pediatrics)

1934—Fred E. Motley, M.D. .......... Charlotte
"Complications of Mastoiditis with Special Reference to Septicemia"
(From Section on Ophthalmology and Otolaryngology)

1935—Arthur H. London, M.D. .......... Durham
"The Composition of an Average Pediatrics Practice"
(From Section on Pediatrics)

1936—V. K. Hart, M.D. .......... Charlotte
"Etiological and Therapeutic Aspects of Bronchiectasis with Clinical Observations on Bronchial Lavage by the Stitt Method"
(From Section on Ophthalmology and Otolaryngology)

1937—No award made.

1938—O. Hunter Jones, M.D. .......... Charlotte
"Pelvic Architecture and Classification with its Practical Application"
(From Section on Gynecology and Obstetrics)

1939—Donnell B. Cobb, M.D.......................Goldsboro
"Vaginal Ureterolithotomy"
(From Section on Surgery)

1940—C. R. Monroe, M.D., C.D. Thomas, M.D., and C. L. Gray, M.D............................Pinehurst
"Thoracoplasty and Apicolysis"
(From Section on Surgery)

1941—Walter R. Johnson, M.D....................Asheville
"Is Diverticulitis of the Colon a Surgical Disease?"
(From Section on Practice of Medicine)

1942—E. P. Alyea, M.D...................................Durham
"Castration for Carcinoma of the Prostate Gland"
(From Section on Surgery)

1943—No award made.

1944—D. F. Milam, M.D............................Chapel Hill
"Vitamin C Content of Some North Carolina Cooked Foods"
(From Section on Public Health and Education)

1945—No Meeting.

1946—E. C. Hamblen, M.D..............................Durham
"Some Aspects of Sex Endocrinology in General Practice"
(From Section on General Practice of Medicine and Surgery)

## OFFICERS

### OFFICERS 1946-1947

President—William M. Coppridge, M.D.......Durham
President-Elect—Frank A. Sharpe, M.D...Greensboro
First Vice President—George Erick Bell, M.D. Wilson
Second Vice President—James B. Bullitt, M.D. Chapel Hill
Secretary-Treasurer—Roscoe D. McMillan, M.D. (1946-1949) ..........................................Red Springs

### OFFICERS 1947-1948

President—Frank A. Sharpe, M.D............Greensboro
President-Elect—J. F. Robertson, M.D...Wilmington
First Vice President—V. K. Hart, M.D.......Charlotte
Second Vice President—J. G. Raby, M.D.......Tarboro
Secretary-Treasurer—Roscoe D. McMillan, M.D. (1946-1949) ..........................................Red Springs

### COUNCILORS 1946-1949

First District—J. Gaddy Matheson, M.D.......Ahoskie
Second District—John Cotten Tayloe, M.D. Washington
Third District—Donald B. Koonce, M.D...Wilmington
Fourth District—Newsom P. Battle, M.D. Rocky Mount
Fifth District—John N. Robertson, M.D. Fayetteville
Sixth District—Millard D. Hill, M.D............Raleigh
Seventh District—Elias S. Faison, M.D.....Charlotte
Eighth District—James H. McNeill, M.D. North Wilkesboro
Ninth District—Irving E. Shafer, M.D.......Salisbury
Tenth District—Donald M. McIntosh, Sr., M.D. Old Fort

### SECTION CHAIRMEN 1947-1948

General Practice of Medicine and Surgery—G. O. Moss, M.D., Cliffside
Ophthalmology and Otolaryngology—W. P. Speas, M.D., Winston-Salem
Practice of Medicine—Julian M. Ruffin, M.D., Durham
General Surgery—Howard H. Bradshaw, M.D., Winston-Salem
Pediatrics—F. B. Haar, M.D., Greenville
Gynecology and Obstetrics—T. D. Tyson, Jr., M.D., High Point
Public Health and Education — Robert F. Young, M.D., Halifax
Neurology and Psychiatry—Robert W. Graves, M.D., Durham
Radiology—J. P. Rousseau, M.D., Winston-Salem

### DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION

Roscoe D. McMillan, M.D. (1946-1948)..Red Springs
C. F. Strosnider, M.D. (1946-1948)..............Goldsboro
Hamilton W. McKay, M.D. (1946-1948)....Charlotte
Wingate M. Johnson, M.D., Alternate Winston-Salem
Ross S. McElwee, M.D., Alternate............Statesville
G. G. Dixon, M.D., Alternate...............................Ayden

### DELEGATES TO THE MEDICAL SOCIETY OF VIRGINIA, 1947 MEETING

P. Y. Joyner, M.D. ..............................................Enfield
Alban Papineau, M.D. ...................................Plymouth
Harry L. Johnson, M.D. .........................................Elkin

### DELEGATES TO MEDICAL ASSOCIATION OF SOUTH CAROLINA, 1948 MEETING

Frank P. Ward, M.D. ..................................Lumberton
Lewis R. Gaskin, M.D....................................Albemarle
C. H. Pugh, M.D. ..........................................Gastonia

### DELEGATES TO MEDICAL ASSOCIATION OF GEORGIA, 1948 MEETING

R. W. Mathews, M.D.....................................Greensboro
W. H. Hoover, M.D. ..........................................Murphy
B. H. Kendall, M.D. ...........................................Shelby

### DELEGATES TO TENNESSEE STATE MEDICAL ASSOCIATION, 1948 MEETING

B. O. Edwards, M.D. ......................................Asheville
G. W. Murphy, M.D. ......................................Asheville
S. A. Whitehead, M.D. ...................................Asheville

## COMMITTEES

### 1947-1948

**Committee to work with the North Carolina Industrial Commission to evolve a satisfactory plan for the administration of the Medical Provisions of the Workmen's Compensation Act**

G. Westbrook Murphy, M.D., Chairman......Asheville
R. B. Davis, M.D. .........................................Greensboro
Frank C. Smith, M.D. ....................................Charlotte
Hugh A. Thompson, M.D. ...............................Raleigh
Rowland T. Bellows, M.D. ............................Charlotte
M. H. Greenhill, M.D. ......................................Durham
A. C. Ambler, M.D. .......................................Asheville
Verne S. Caviness, M.D. ..................................Raleigh
T. R. Huffines, M.D. .....................................Asheville
Harry Winkler, M.D. ......................................Charlotte

**Committee on Child Welfare**

A. H. London, Jr., M.D., Chairman................Durham
C. R. Bugg, M.D. ..............................................Raleigh
R. L. Pearse, M.D. ...........................................Durham
Maline G. Irons, M.D. ...................................Greenville

**Advisory Committee to Auxiliary**

Rachel D. Davis, M.D., Chairman...................Kinston
Annie Louise Wilkerson, M.D. .........................Raleigh
Annie T. Smith, M.D. .......................................Durham
Lois Foote Stanford, M.D. ................................Durham
Olivia Abernethy, M.D. .......................................Elkin

### Cancer

| | |
|---|---|
| T. Leslie Lee, M.D., Chairman | Kinston |
| Ivan M. Procter, M.D. | Raleigh |
| L. P. Williams, M.D. | Edenton |
| H. B. Ivey, M.D. | Goldsboro |
| Robert P. Morehead, M.D. | Winston-Salem |
| E. McG. Hedgpeth, M.D. | Chapel Hill |
| Hugh A. McAllister, M.D. | Lumberton |
| F. L. Knight, M.D. | Sanford |
| B. W. McKenzie, M.D. | Salisbury |
| Monroe T. Gilmour, M.D. | Charlotte |
| F. M. Houser, M.D. | Cherryville |
| Edward W. Schoenheit, M.D. | Asheville |

### Finance

| | |
|---|---|
| V. M. Hicks, M.D., Chairman | Raleigh |
| F. P. Hunter, M.D. | Warrenton |
| Adam T. Thorp, M.D. | Rocky Mount |
| Robert J. Reeves, M.D. | Durham |
| Wayne J. Benton, M.D. | Greensboro |

### Hospitals

| | |
|---|---|
| Fred C. Hubbard, M.D., Chairman | North Wilkesboro |
| Harry L. Brockmann, M.D. | High Point |
| Harry L. Johnson, M.D. | Elkin |
| P. G. Fox, M.D. | Raleigh |
| R. D. Kornegay, M.D. | Rocky Mount |

### Industrial Health

| | |
|---|---|
| Harry Winkler, M.D., Chairman | Charlotte |
| Joseph J. Combs, M.D. | Raleigh |
| C. B. Davis, M.D. | Wilmington |
| David G. Welton, M.D. | Charlotte |
| Hugh A. Matthews, M.D. | Canton |

### Legislation

| | |
|---|---|
| M. D. Hill, M.D., Chairman | Raleigh |
| Hubert B. Haywood, M.D., Advisory Chairman | Raleigh |
| Joseph J. Combs, M.D. | Raleigh |
| George W. Paschal, M.D. | Raleigh |

### Committee to study ways and means of establishing an Executive Secretary for the Medical Society

| | |
|---|---|
| G. Erick Bell, M.D., Chairman | Wilson |
| J. Street Brewer, M.D. | Roseboro |
| Roscoe D. McMillan, M.D. | Red Springs |
| Monroe T. Gilmour, M.D. | Charlotte |
| Lenox D. Baker, M.D. | Durham |
| Zack D. Owens, M.D. | Elizabeth City |
| Wm. M. Coppridge, M.D. | Durham |

### Advisory Committee to North Carolina Medical Care Commission

| | |
|---|---|
| Harry L. Brockmann, M.D., Chairman | High Point |
| James W. Vernon, M.D. | Morganton |
| Zack D. Owens, M.D. | Elizabeth City |
| F. P. James, M.D. | Laurinburg |
| Adam T. Thorp, M.D. | Rocky Mount |

### Committee to confer with a similar committee authorized by the North Carolina Hospital Association and with the Executive Vice President of the Hospital Care Association, Inc., and the Executive Vice President of the North Carolina Hospital Saving Association in an effort to bring about a merger between the Hospital Care Association, Inc., and the North Carolina Hospital Saving Association

| | |
|---|---|
| George L. Carrington, M.D., Chairman | Burlington |
| Arthur H. London, M.D. | Durham |
| D. T. Smith, M.D. | Durham |

### Mental Hygiene

| | |
|---|---|
| A. B. Choate, M.D., Chairman | Charlotte |
| David A. Young, M.D. | Raleigh |
| Lloyd J. Thompson, M.D. | Winston-Salem |
| R. Burke Suitt, M.D. | Durham |
| J. F. Owen, M.D. | Raleigh |
| H. R. Parker, M.D. | Greensboro |
| Leslie B. Hohman, M.D. | Durham |
| Robert W. Graves, M.D. | Durham |

### Moore County Medal Award

| | |
|---|---|
| F. B. Marsh, M.D., Chairman | Salisbury |
| C. T. Smith, M.D. | Rocky Mount |
| Robert L. McMillan, M.D. | Winston-Salem |
| Robert M. McMillan, M.D. | Southern Pines |

### Obituary

| | |
|---|---|
| A. A. James, M.D., Chairman | Sanford |
| C. R. Monroe, M.D. | Pinehurst |
| M. D. Bonner, M.D. | Jamestown |

### Postgraduate Medical Study

| | |
|---|---|
| W. C. Davison, M.D., Chairman | Durham |
| W. Reece Berryhill, M.D. | Chapel Hill |
| C. C. Carpenter, M.D. | Winston-Salem |

### Publication

| | |
|---|---|
| Roscoe D. McMillan, M.D., Chairman | Red Springs |
| Wingate M. Johnson, M.D., Secretary | Winston-Salem |
| W. Reece Berryhill, M.D. | Chapel Hill |
| W. C. Davison, M.D. | Durham |
| C. C. Carpenter, M.D. | Winston-Salem |
| Paul H. Ringer, M.D. | Asheville |
| Hubert A. Royster, M.D. | Raleigh |
| E. W. Furgurson, M.D. | Plymouth |

### Public Relations

| | |
|---|---|
| Donald B. Koonce, M.D., Chairman | Wilmington |
| J. Stuart Gaul, M.D. | Charlotte |
| John S. Rhodes, M.D. | Raleigh |
| Amos N. Johnson, M.D. | Garland |
| H. H. Briggs, M.D. | Asheville |

### Committee to cooperate with Council on Medical Service and Public Relations of American Medical Association

| | |
|---|---|
| Wingate M. Johnson, M.D., Chairman | Winston-Salem |
| C. F. Strosnider, M.D. | Goldsboro |
| Ross S. McElwee, M.D. | Statesville |

### Tuberculosis

| | |
|---|---|
| S. M. Bittinger, M.D., Chairman | Oteen |
| H. Stuart Willis, M.D. | Sanatorium |
| H. F. Easom, M.D. | Wilson |
| C. D. Thomas, M.D. | Black Mountain |
| †F. T. Harper, M.D. | Burlington |
| Joseph J. Combs, M.D. | Raleigh |
| M. D. Bonner, M.D. | Jamestown |
| Paul A. Yoder, M.D. | Winston-Salem |
| H. L. Seay, M.D. | Huntersville |

† Deceased

### Scientific Work

| | |
|---|---|
| Roscoe D. McMillan, Chairman | Red Springs |
| Lenox D. Baker, M.D. | Durham |
| George T. Harrell, M.D. | Winston-Salem |
| John G. Smith, M.D. | Rocky Mount |
| S. M. Carrington, M.D. | Oxford |

### Insurance

| | |
|---|---|
| Alban Papineau, M.D., Chairman | Plymouth |
| D. J. Rose, M.D. | Goldsboro |
| E. McG. Hedgpeth, M.D. | Chapel Hill |
| H. Frank Starr, M.D. | Greensboro |
| Verne S. Caviness, M.D. | Raleigh |

### Historical Commission

| | |
|---|---|
| K. P. B. Bonner, M.D., Chairman | Morehead City |
| Paul H. Ringer, M.D. | Asheville |
| F. R. Taylor, M.D. | High Point |
| W. M. Johnson, M.D. | Winston-Salem |
| W. C. Davison, M.D. | Durham |
| L. A. Crowell, M.D. | Lincolnton |
| C. C. Carpenter, M.D. | Winston-Salem |
| James W. Vernon, M.D. | Morganton |
| James B. Bullitt, M.D. | Chapel Hill |

### A Conference Committee on Crime and Psychiatry cooperating with the North Carolina Bar Association

| | |
|---|---|
| James W. Vernon, M.D., Chairman | Morganton |
| W. T. Parrott, M.D. | Kinston |
| R. S. Lyman, M.D. | Durham |
| Elbert A. MacMillan, M.D. | Winston-Salem |
| J. F. Owen, M.D. | Raleigh |

### Maternal Welfare

| | |
|---|---|
| Frank R. Lock, M.D., Chairman | Winston-Salem |
| Ernest W. Franklin, M.D. | Charlotte |
| R. A. White, M.D. | Asheville |
| R. A. Ross, M.D. | Durham |
| G. M. Cooper, M.D. | Raleigh |
| Ivan M. Procter, M.D. | Raleigh |
| T. Leslie Lee, M.D. | Kinston |
| Jasper S. Hunt, M.D. | Charlotte |
| J. Street Brewer, M.D. | Roseboro |

### Committee to Collaborate with National Physicians Committee

| | |
|---|---|
| George L. Carrington, M.D., Chairman | Burlington |
| G. Westbrook Murphy, M.D. | Asheville |
| A. L. Daughtridge, M.D. | Rocky Mount |

### Physician Members of the North Carolina Medical Care Commission

| | |
|---|---|
| Fred C. Hubbard, M.D., Chairman | North Wilkesboro |
| J. Street Brewer, M.D. | Roseboro |
| W. M. Coppridge, M.D. | Durham |

### Rural Health and Medical Care

| | |
|---|---|
| Fred C. Hubbard, M.D., Chairman | North Wilkesboro |
| W. Reece Berryhill, M.D. | Chapel Hill |
| M. D. Hill, M.D. | Raleigh |

### John Alexander McMillan Memorial Award

| | |
|---|---|
| James B. Bullitt, M.D., Chairman | Chapel Hill |
| K. B. Pace, M.D. | Greenville |
| John B. Hunter, M.D. | Shelby |

### Committee to work in conjunction with the Hospital Saving Association to familiarize the doctors of the state with the requirements of the Veterans Administration

| | |
|---|---|
| E. McG. Hedgpeth, M.D., Chairman | Chapel Hill |
| E. I. Bugg, M.D. | Durham |
| Alexander Webb, Jr., M.D. | Raleigh |
| J. H. McNeill, M.D. | North Wilkesboro |
| J. B. Stevens, M.D. | Greensboro |

### Committee to review the matter of hospitals, medical and surgical insurance, make specific recommendations for practical expansions of hospital insurance, outline a fee schedule for all surgical procedures for people of low income, and recommend a similar fee schedule to cover all major medical illnesses requiring hospitalization, and to submit final report to Executive Committee

| | |
|---|---|
| V. K. Hart, M.D., Chairman | Charlotte |

### Board of Medical Examiners of the State of North Carolina, 1944-1950

| | |
|---|---|
| C. W. Armstrong, M.D. | Salisbury |
| M. D. Bonner, M.D. | Jamestown |
| T. Leslie Lee, M.D. | Kinston |
| Roy B. McKnight, M.D. | Charlotte |
| Paul G. Parker, M.D. | Erwin |
| M. A. Pittman, M.D. | Wilson |
| Ivan M. Procter, M.D. | Raleigh |

### Committee to arrange for facilities for Annual Meeting

| | |
|---|---|
| Roscoe D. McMillan, M.D., Chairman | Red Springs |
| O. B. Bonner, M.D. | High Point |
| A. H. London, M.D. | Durham |
| F. L. Owens, M.D. | Pinehurst |

### Committee to study ways and means of improving our organization
### (The Medical Society of the State of North Carolina)

| | |
|---|---|
| C. T. Smith, M.D., Chairman | Rocky Mount |
| W. M. Coppridge, M.D. | Durham |
| Robert L. McMillan, M.D. | Winston-Salem |
| Monroe T. Gilmour, M.D. | Charlotte |
| M. D. Bonner, M.D. | Jamestown |
| J. Stuart Gaul, M.D. | Charlotte |
| E. E. Menefee, M.D. | Durham |
| Ralph G. Fleming, M.D. | Durham |
| W. L. Thomas, M.D. | Durham |
| R. H. Crawford, M.D. | Rutherfordton |
| W. W. Noel, M.D. | Henderson |
| A. A. James, M.D. | Sanford |
| Alexander Webb, Jr., M.D. | Raleigh |
| F. P. Hunter, M.D. | Warrenton |
| W. T. Rainey, M.D. | Fayetteville |

### Committee to Cooperate with the North Carolina Dental Society

| | |
|---|---|
| Henderson Irwin, M.D., Chairman | Eureka |
| E. W. Phifer, M.D. | Morganton |
| George Francis Busby, M.D. | Salisbury |
| W. C. Bostic, Jr., M.D. | Forest City |
| Charles S. Allen, M.D. | Wadesboro |
| E. C. Bennett, M.D. | Elizabethtown |
| Hugh McManus, M.D. | Raleigh |

# SESSIONS OF THE HOUSE OF DELEGATES

## MONDAY AFTERNOON SESSION

### May 12, 1947

The House of Delegates of the Medical Society of the State of North Carolina met in annual session in the ballroom of the Cavalier Hotel, Virginia Beach, Virginia, on Monday, May 12, 1947, with the president of the Society, Dr. William M. Coppridge of Durham, presiding. Following the call to order by the president and the invocation by Rev. Coy Petersen, the roll was called by the secretary-treasurer, Dr. Roscoe McMillan of Red Springs. A quorum was declared to be present.

Dr. Erick Bell of Wilson, first vice president, then took the chair, and President Coppridge read his report to the House of Delegates.

### Report of the President

It has been customary, I believe, for the president at this time to give you a resume of all the activities of our organization during the past year. If you will permit me I will, to some extent at least, break this precedent. You will soon have reports from the secretary-treasurer and from the chairmen of our various committees; also, each councilor will tell you of happenings within his district. No good purpose would be served by my preceding them with many of the same facts. Former meetings of this body have been so pressed for time that I feel disposed to make my remarks very brief. In this way it is hoped that more time will be available to the members for discussion of the various matters to come before us.

The operation of the Society since our last meeting has, in my opinion, proceeded satisfactorily, thanks to the efficiency of our secretary, our councilors, and our committee chairmen. A great volume of work has been done with a splendid spirit of cooperation among your officers. Attendance at our various meetings has been good and interest in our endeavors has been most encouraging.

In this legislative year many issues of importance have been dealt with by your Legislative Committee. This group was unusually successful in its efforts. As the various other committees report, I think you will be impressed by their accomplishments.

Allow me to tabulate what I consider our most important achievements of the year:

(1) Your Society's representatives on the Medical Care Commission were successful in securing the adoption by the Commission of the majority report of the National Committee for the Medical School Survey. This report was adopted on August 8 through the impressive leadership of Dr. Paul Whitaker. This program, approved, endorsed, and urged by your Executive Committee and by the Advisory Committee, and supported so strongly by the citizens of the state, was enacted into law with little final opposition in the closing days of the legislature.

(2) Your Committee on Nursing, ably led by Dr. M. D. Hill, succeeded in prevailing upon the State Nurses Association to modify their bill changing the Nurses Practice Act so that it conformed to the ideas of your Executive Committee. The law as enacted is satisfactory in every particular, and I am glad to report that for the time being, at least, we are at peace with the nurses.

(3) Your officers working with the North Carolina Hospital Association sponsored the bill to license practical nurses. It passed after some difficulty. I urge of you all to familiarize yourselves with it. Our feeling is that this legislation is most important, in that all the hospitals of the state can now offer one-year courses for training a new type of nurse that is so desperately needed everywhere.

(4) The perennial osteopath's bill was contested in the committee and unanimous rejection was secured by the Society.

(5) Several vicious bills designed to modify medical practice or licensure were combated and discouraged before they were introduced. There are ominous signs that we may be in for hard fights along this line in future years. We need much improved public relations if we are to cope successfully with important opposition.

Other committees whose work did not entail legislative action will soon report to you. I will not enumerate them or comment upon their work. We are all indebted to them for their fine service.

It is customary also for the president at this time to suggest courses of future action and make recommendations of new activities that may be attempted.

My work with you this year has convinced me that our greatest need is for more consolidation of organization, to the end that we may accomplish more unity of thought and effort. This can hardly be done with our present staff of officers and employees. They have done all that could be expected of them and have served us well. It is too much to expect this Society of more than two thousand members to function efficiently and progress as it should with the same staff and same system that served us when we had two or three hundred members. The multitude of issues affecting us and our work, and the great distances to be covered, would seem to demand an organization at least as large and efficient as that of the nurses or of the pharmacists, for example. This body should seriously consider expansion of personnel, because our many activities require certain cohesion of thought and action that is impossible to attain without the services of a full-time executive working under the direction of your officers. It seems desirable that we lay plans now for establishing permanent executive offices within a few years. To that end, I suggest the appointment of a committee to be known as "The Committee for the improvement of our organization." Fifteen members would not be too many, and it should include members from every district as well as representatives from the three medical schools. Its functions could be as follows:

(1) To study methods of strengthening our organizations in general;

(2) To suggest means of improving our public relations;

(3) To study the ways and means of establishing permanent executive offices in a central location and increase the executive personnel of the Society;

(4) To consult and cooperate with the Board of Medical Examiners in solving problems of licensure and regulation of medical practice;

(5) To consult the Editorial Board and editors of the **Journal** and seek to aid them in conducting this important enterprise.

Such a committee should attempt to hold quarterly meetings and report regularly to the Executive Committee. It could divide itself into subcommittees to study various phases of work suggested.

Each of you, I am sure, recognizes that the opportunities and obligations of the profession of our state are today unequaled in the nation. In my address to the membership tomorrow I will attempt to elaborate on some thoughts that have occurred to me in this regard. The committee to collaborate with the Medical Care Commission should be continued so that the Society and the membership may be kept advised of the work of the Commission. I am sure the Commission cherishes the support of the Society and will rely heavily upon us for consultation and advice.

It is my hope that you, the governing body, will consider carefully ways and means of increasing our power through perfection of a stronger organization. Until this is done, it is doubtful that we can increase our activities. The work and functions of our present committees cover fairly adequately our needs of today and for the immediate future. Our great requirement is more coordination of their activities, with more general dissemination of information among the members. It is possible that our committees should be, in most instances, enlarged, by addition of more of our younger men. Our future in medicine depends upon them. They should be encouraged to accept their duties in this regard early in their professional lives.

I wish to thank all the officers and members of committees. Especially do I commend and thank our secretary, Roscoe McMillan, for his splendid cooperation and sympathetic help. I am grateful, too, to the scores of members for their fine support this year. No one has ever had the good fortune to work with a finer group. My sincere appreciation goes to you all.

William M. Coppridge, M.D.

. . . President Coppridge took the chair again and called for the secretary-treasurer's report.

### Report of the Secretary-Treasurer

This has been a very active year, particularly since it has been a legislative one. My purpose is to give you, more or less, an over-all picture, inasmuch as the committees will make detailed reports. I do want to say at the outset, however, that the committees have been more active than previously. I am firmly convinced that the meetings of the different committees with the Executive Committee on five different occasions have been most helpful both to the committees and to the Society.

The membership for 1946 shows an increase over that of 1945. We had a total membership of 2073, which represents 396 honorary fellows, 45 fellows in service, and 1630 active fellows. Sixty-three doctors have died during the past year, forty-six of whom were members of the Society.

I am again insisting that each county medical society should have as its goal a 100 per cent membership of all eligible doctors within its boundaries. I am glad to report that since this goal was stressed, we now have 40 county medical societies that have obtained this coveted honor.

We accomplished much during the 1947 legislature. In fact, we were granted every request. The biennial request of the osteopaths for the privilege of practicing medicine in an emergency was overwhelmingly defeated. In its tremendous undertaking, the medical care program was successful before the legislature.

As your secretary, I made numerous visits throughout the year to the various district and county societies. While I was not able to attend all the meetings—in many instances because of conflicting dates—, I am sure that organized medicine as a whole is meeting adequately the growing demands made upon it.

I regret exceedingly that we were not able to hold the ninety-third annual session within the borders of North Carolina. This circumstance will be explained by the Committee on Arrangements at the proper time. However, I do want to say now that every effort was made by your committee; but on account of inadequate hotel facilities, it was impossible to meet within the state in 1947. I wish to tell you that our efforts have been successful in obtaining a meeting place in North Carolina for 1948.

The auditor's report for 1946 is hereto attached and will be published in the August issue of the **Journal**; therefore, I will not go into details. For your information I will say that we have no liabilities, and our revenue receipts exceed the expense disbursements by $9,915.47—an increase of 121 per cent over a period of four years.

We made an investment in series F bonds of the cash value of $10,360.00. This brings the total bonds held at the close of 1946 to the cash value of $34,884.00. On December 31, 1946, our checking account in the Scottish Bank of Red Springs was $4,730.76. We lived within our budget, and I feel confident that the proposed budget which will be offered by the Finance Committee, if acceptable, will be sufficient to carry on our needs for 1947, and that we will live within our budget still and show a net profit.

As business manager of the **Journal**, I submit the following statement of income and expenditures:

| | |
|---|---|
| **Receipts:** | |
| Society appropriation | $14,645.00 |
| Advertising, etc. | $15,661.69 |
| Total | $30,416.69 |
| **Expenditures:** | |
| Editor's salary | 1,800.00 |
| Assistant editor's salary | 1,500.00 |
| Rent | 300.00 |
| Printing of **Journal** | 9,686.22 |
| Total | $13,286.22 |
| Excess of receipts over expenditures | $17,130.47 |

The **Journal** made a net profit for the Society of $2,485.47; the revenue from advertisements shows an increase over 1945 of 81.1 per cent.

At the close of another year I wish to express to each of you—especially to the Executive Committee, to all other committees, and to President Coppridge—my personal gratitude for your creditable work, your thoughtfulness and cooperation during the year.

Respectfully submitted,
Roscoe D. McMillan, M.D.

### Proposed Budget for 1947

| | |
|---|---|
| **Receipts:** | |
| Membership dues | $15,000.00 |
| Advertising | 13,650.00 |
| Other sources | 400.00 |
| Total receipts | $29,050.00 |
| **Expenditures:** | |
| Secretary's office | |
| Salary | $ 2,400.00 |
| Clerical assistance | 1,800.00 |
| Stationery and stamps | 700.00 |
| Rent | 300.00 |
| Travel expense | 600.00 |
| Auditing | 100.00 |
| Miscellaneous and emergency | 700.00 |
| Total secretary's office | $ 6,600.00 |
| **North Carolina Medical Journal** | |
| Editor's salary | 1,800.00 |
| Assistant editor's salary | 1,500.00 |
| Rent | 300.00 |
| Printing **Journal** | 12,500.00 |

| | |
|---|---|
| **Total North Carolina Medical Journal** | $16,100.00 |
| All offices except secretary's | |
| Stationery and miscellaneous | 400.00 |
| Councilors' travel expense | 250.00 |
| President's travel expense | 400.00 |
| Executive Committee | 500.00 |
| Attorney's fees and Legislative Committee | 2,500.00 |
| Other committees | 1,000.00 |
| State meeting reporting | 600.00 |
| A. M. A. Delegates | 600.00 |
| Guest speaker | 100.00 |
| Total other offices | 6,350.00 |
| Total expenditures | $29,050.00 |

## Audit Report

### January 1, 1946 to December 31, 1946

February 18, 1947

Chairman and Members of the Finance Committee
Medical Society of the State of North Carolina, Inc.
Red Springs, North Carolina

Gentlemen:

Pursuant to engagement, we have made an examination and audit of the Cash Receipt and Disbursements records of Dr. Roscoe D. McMillan, Secretary-Treasurer of the Medical Society of the State of North Carolina, Inc., Red Springs, N. C., for the year ended at December 31, 1946.

A report of such examination and audit, consisting of four Exhibits and two Schedules, enumerated as follows, is submitted herewith, and is subject to the comment contained herein:

| | |
|---|---|
| Exhibit A | Balance Sheet |
| Exhibit B | Budget Comparison—Receipts and Disbursements |
| Exhibit C | Cash Receipts and Disbursements |
| Exhibit D | Comparative Statements |
| Schedule 1 | Reconciliation of Cash |
| Schedule 2 | Investment in United States Defense Bonds |

### Scope of Audit

The scope of the audit consisted of a detailed examination of the office cash book, which book is used as a record of original entry for receipts and disbursements. The receipts as shown therein were accepted as being correct without further audit. All paid and cancelled bank checks and supporting vouchers were examined for the purpose of verifying the correctness of the disbursements. The Assets were verified to the extent set forth hereinafter.

### Balance Sheet—Exhibit A

A Balance Sheet, which is designated herein as Exhibit A, has been prepared to show the Assets, Liabilities and Net Worth of the Medical Society at December 31, 1946.

This Balance Sheet has been divided into two sections. One section contains the Current Operating Fund, which represents the Current Assets and Liabilities, while the other Fund has been designated as a Capital or Non-Operating Fund and which contains the office equipment owned and used by the Medical Society at estimated values established in a prior year. The Balance Sheet shows the Net Worth or unencumbered and unappropriated balances of the two Funds to be $39,614.76 and $1,091.32, respectively.

The cash in the Scottish Bank, Red Springs, N. C., in the amount of $4,730.76, was verified through a reconciliation of the balances as shown by the records of the Secretary-Treasurer of the Medical Society with a statement which was obtained independently from the depository. This reconciliation is shown in detail in Schedule 1 of the report.

The investment in United States Defense and Savings Bonds has been shown at cost value of $34,884.00, in the Balance Sheet, and in detail in Schedule 2, of this report. These bonds were examined.

The office equipment which has been shown in detail in the Balance Sheet under the heading of Capital or Non-Operating Fund, was brought forward from an estimate made in a prior year and adjusted for purchases made during the year under review. The items shown herein represent equipment of the Medical Society, now located in the office of Dr. McMillan. As there were no liabilities outstanding against the office equipment, we have shown the entire amount as Net Worth of the Medical Society under an appropriate heading in the Balance Sheet.

No record was found of any liabilities against the Medical Society at the close of the year under audit.

### Budget Comparison—Receipts and Disbursements Exhibit B

A statement showing a Budget Comparison of the Cash Receipts and Disbursements for the current year operations of the Medical Society, has been shown in Exhibit B. This statement is, in effect, a statement of operations, and by examination, it will be seen that the Revenue Receipts exceeded the Expense Disbursements, by $9,915.47, for the current year. This amount represents an Operating Surplus and has been added to the unexpended balance of the Current Fund and shown in the Net Worth section of the Balance Sheet.

### Cash Receipts and Disbursements—Exhibit C

A statement showing in detail the Cash Receipt and Disbursement of funds passing through the hands of Dr. Roscoe D. McMillan, Secretary-Treasurer of the Medical Society during the year under review, has been shown in Exhibit C, which may be summarized as follows:

| | | |
|---|---|---|
| Cash balance January 1, 1946 | | $ 5,457.11 |
| Cash Receipts during Year (Including Refunds) | | 33,121.09 |
| Total Cash Available | | $38,578.20 |
| Less—Disbursements During Current Year: | | |
| For Operations (Including Refunds) | $23,052.62 | |
| Non-Operating Items | 434.82 | |
| Purchase of U.S.A. Savings Bonds as an Investment | 10,360.00 | 33,847.44 |
| Cash Balance at December 31, 1946 | | $ 4,730.76 |

### Comparative Statements—Exhibit D

As information to the Medical Society, we have prepared a statement showing in condensed form the Balance Sheet and the Cash Receipts and Disbursements for each of the years 1943, 1944, 1945 and 1946. This statement has been designated as Exhibit D.

It is interesting to observe the continuous increase in the Net Worth or unencumbered balance which has more than doubled since January 1, 1943. This item may be summarized as follows:

| | *Net Worth* | *Increase During Year* | *Per Cent of Increase* |
|---|---|---|---|
| Balance January 1, 1943 | $18,455.53 | $ | (Basis 100%) |
| Balance December 31, 1943 | 20,562.18 | 2,106.65 | 11% |
| Balance December 31, 1944 | 24,219.06 | 3,656.88 | 20% |

| | | | |
|---|---|---|---|
| Balance December 31, 1945 | 30,790.61 | 6,571.55 | 36% |
| Balance December 31, 1946 | 40,706.08 | 9,915.47 | 54% |
| TOTAL INCREASE IN FOUR YEARS | | $22,250.55 | |
| TOTAL PER CENT OF INCREASE OVER BALANCE AT JANUARY 1, 1943 | | | 121% |

### General Comment

It should be understood that this report has been prepared on a strictly Cash Receipts and Disbursements basis. Therefore, no receivables have been shown in the report which may have been due, but uncollected at the close of the year. Likewise, no liabilities have been shown.

A surety bond covering faithful performance of the Secretary-Treasurer of the Medical Society was examined by us and appears as follows:

Dr. Roscoe D. McMillan, Secretary-Treasurer
Maryland Casualty Company
Dated 6-15-41—Term Continuous
Premium paid to 6-15-47
Principal Sum $20,000.00

An insurance policy was also examined which covers fire loss in the amount of $1,500.00, on office equipment, books and records in the office of the Secretary-Treasurer. This policy is dated June 10, 1944 and expires June 10, 1947.

As may be observed by the examination of the statement of U. S. Defense and Savings Bonds, Schedule 2, the Medical Society made an investment during the year, of $10,360.00, in Series "F" Bonds. This brings the total bonds held, at cost value, to $34,884.00; however, there is also an unrecorded increment in value of the Series "F" bonds, of approximately $1,100.00, due to lapse of time since the purchase date of the bonds.

We are glad to inform you that the financial records as maintained by the Secretary-Treasurer, were found, upon examination by us, to have been well kept and in an excellent condition.

In conclusion, we wish to express our appreciation for the many courtesies and cooperation shown us during the course of the audit.

Respectfully submitted,

S. Preston Douglas
Certified Public Accountant

### EXHIBIT A—BALANCE SHEET

December 31, 1946

ASSETS

| | | |
|---|---|---|
| CURRENT OPERATING FUND: | | |
| Cash: (Schedule 1) | | |
| The Scottish Bank, Red Springs, N. C. | | $ 4,730.76 |
| Investment in U.S.A. Bonds—At Cost (Schedule 2) | | 34,884.00 |
| TOTAL ASSETS—CURRENT OPERATING FUND | | $39,614.76 |
| CAPITAL or NON-OPERATING FUND: | | |
| Underwood Typewriter | $ 115.00 | |
| Wooden File Case (Letter-size) | 21.66 | |
| Typewriter Desk | 25.00 | |
| Steel Office Safe | 150.00 | |
| Burroughs Adding Machine | 200.00 | |
| Checkwriter (Paymaster) | 40.00 | |
| Electric Mimeograph Machine | 300.00 | |
| Steel File Case (Letter-size) | 20.00 | |
| Four Steel Card Files | 20.00 | |
| Office Chairs | 35.20 | |
| One Desk | 62.55 | |
| Steel Filing Cabinet | 24.50 | |
| Office Desk | 47.95 | |
| Letter File—Two Drawer | 29.46 | 1,091.32 |
| TOTAL ASSETS | | $40,706.08 |

LIABILITIES AND NET WORTH

| | | |
|---|---|---|
| LIABILITIES | | $ —0— |
| NET WORTH: | | |
| Current Operating Fund: | | |
| Balance January 1, 1946 | $29,776.70 | |
| Plus—Net Increase during Current Year per Budget Comparison Statement (Exhibit B) | 9,915.47 | |
| | $39,692.17 | |
| Less—Expenditures made for Capital Additions | 77.41 | 39,614.76 |
| Capital Fund—Non-Operating: | | |
| Balance January 1, 1946 | $ 1,013.91 | |
| Plus—Purchases during Year from Current Funds | 77.41 | 1,091.32 |
| TOTAL LIABILITIES AND NET WORTH | | $40,706.08 |

### EXHIBIT B—BUDGET COMPARISON—RECEIPTS AND DISBURSEMENTS

January 1, 1946 to December 31, 1946

| | *Budget Provision* | *Actual Receipts or Disbursements* | *Under(*) Realized Receipts or Over(*) Expended* |
|---|---|---|---|
| RECEIPTS: | | | |
| Membership Dues—Current and Prior Years (Less Refunds of $149.00) | $13,300.00 | $16,822.00 | $ 3,522.00 |
| Advertising | 12,000.00 | 15,771.69 | 3,771.69 |
| Other Sources | 600.00 | 374.40 | 225.60* |
| TOTAL RECEIPTS | $25,900.00 | $32,968.09 | $ 7,068.09 |
| EXPENDITURES: | | | |
| Secretary's Office: | | | |
| Salary | $ 2,400.00 | $ 2,400.00 | $ —0— |
| Clerical Assistance | 1,800.00 | 1,800.00 | —0— |
| Stationery and Stamps | 700.00 | 474.26 | 225.74 |
| Rent | 300.00 | 300.00 | —0— |
| Travel Expense | 600.00 | 600.00 | 0 |
| Auditing | 80.00 | 80.00 | —0— |
| Miscellaneous and Emergency | 700.00 | 571.88 | 128.12 |
| TOTAL—SECRETARY'S OFFICE | $ 6,580.00 | $ 6,226.14 | $ 353.86 |
| North Carolina Medical Journal: | | | |
| Editor's Salary | $ 1,800.00 | $ 1,800.00 | $ 0 |
| Asst. Editor's Salary | 1,500.00 | 1,500.00 | —0 |
| Rent | 300.00 | 300.00 | 0 |
| Printing Journal | 11,045.00 | 9,686.22 | 1,358.78 |
| TOTAL—N. C. MED. JOURNAL | $14,645.00 | $13,286.22 | $ 1,358.78 |
| All Offices except Secretary's: | | | |
| Stationery and Misc. | $ 325.00 | $ 166.83 | $ 158.17 |
| Councilors' Travel Exp. | 250.00 | 250.00 | —0— |
| President's Travel Exp. | 400.00 | 400.00 | —0— |
| Executive Committee | 400.00 | 208.81 | 191.19 |
| Attorney's Fees and Legislative Committee | 1,500.00 | 1,183.74 | 316.26 |
| Other Committees | 1,000.00 | 300.00 | 700.00 |
| State Meeting Reporting | 500.00 | 530.88 | 30.88* |
| A. M. A. Delegates | 200.00 | 400.00 | 200.00* |
| Guest Speaker | 100.00 | 100.00 | 0 |
| TOTAL—OTHER OFFICES | $ 4,675.00 | $ 3,540.26 | $ 1,134.74 |
| TOTAL EXPENDITURES | $25,900.00 | $23,052.62 | $ 2,847.38 |

SUMMARY—BUDGET POSITION

| | |
|---|---|
| RECEIPTS—Excess of Realized over Anticipated | $ 7,068.09 |
| DISBURSEMENTS—Decrease under Appropriations | 2,847.38 |
| NET REVENUE IN EXCESS OF BUDGET APPROPRIATIONS | $ 9,915.47 |

### EXHIBIT C CASH RECEIPTS AND DISBURSEMENTS

January 1, 1946 to December 31, 1946

RECEIPTS

| | |
|---|---|
| CASH RECEIPTS DURING YEAR | |
| Membership Dues—Current and Prior Years | $16,971.00 |
| Medical Journal—Advertising | 15,771.69 |
| Medical Journal—Subscriptions and Issues Sold | 86.90 |
| Interest U. S. Savings Bonds Series "G" | 287.50 |
| Refund of Prior Year Overpayment of Salary | 4.00 |
| TOTAL CASH RECEIPTS DURING YEAR | $33,121.09 |
| CASH BALANCE JANUARY 1, 1946 | 5,457.11 |
| TOTAL CASH AVAILABLE DURING YEAR | $38,578.20 |

DISBURSEMENTS

| | |
|---|---|
| CASH DISBURSEMENTS DURING YEAR | |
| Secretary's Office: | |
| Salary of Secretary | $ 2,400.00 |
| Salary of Clerical Assistant | 1,800.00 |
| Rent | 300.00 |
| Travel | 600.00 |
| Surety Bond of Secretary | 50.00 |

| | | |
|---|---|---|
| Stationery, Supplies and Postage | 474.26 | |
| Telephone and Telegraph | 429.51 | |
| Auditing | 80.00 | |
| Federal O.A.B. Tax | 84.00 | |
| State Tax on Intangibles | 8.37 | $ 6,226.14 |
| **North Carolina Medical Journal:** | | |
| Salary of Editor | $ 1,800.00 | |
| Salary of Assistant Editor | 1,500.00 | |
| Rent | 300.00 | |
| Printing and Mailing Journal | 9,670.85 | |
| Federal O.A.B. Tax | 15.37 | 13,286.22 |
| **Other Operating Expense:** | | |
| President's Travel Expense | $ 400.00 | |
| Councilor's Travel Expense | 250.00 | |
| Delegates to A. M. A. | 400.00 | |
| Executive Committee | 208.81 | |
| Cancer Committee | 300.00 | |
| Legislative and Other Committees | 683.74 | |
| Attorney Fees—Retainer | 500.00 | |
| Convention Speaker | 100.00 | |
| Reprint of Roster | 99.65 | |
| Reporting Convention | 530.88 | |
| Miscellaneous | 67.18 | 3,540.26 |
| TOTAL DISBURSEMENTS FOR OPERATING EXPENSE | | $23,052.62 |
| OTHER DISBURSEMENTS—NON-OPERATING: | | |
| Refund of Membership Dues | $ 149.00 | |
| Prior Year Withholding Tax Paid | 208.41 | |
| Purchase of Filing Cabinet | 29.46 | |
| Purchase of Office Desk | 47.95 | |
| Purchase of U.S.A. Savings Bonds as Investment | 10,360.00 | 10,794.82 |
| TOTAL DISBURSEMENTS DURING YEAR | | $33,847.44 |
| CASH BALANCE DECEMBER 31. 1946 | | |
| The Scottish Bank—Red Springs, N. C. | | 4,730.76 |
| TOTAL CASH DISBURSEMENTS AND BALANCE | | $38,578.20 |

## EXHIBIT D—COMPARATIVE STATEMENTS

January 1, 1943 to December 31, 1946

| | *Year* 1943 | *Year* 1944 | *Year* 1945 | *Year* 1946 |
|---|---|---|---|---|
| **BALANCE SHEET—DECEMBER 31, OF EACH YEAR** | | | | |
| *Assets* | | | | |
| Cash in Bank | $ 3,151.52 | $ 1,840.85 | $ 5,457.11 | $ 4,730.76 |
| Investment in U.S. Bonds—at cost | 16,564.00 | 21,564.00 | 24,524.00 | 34,884.00 |
| Other Current Assets | 10.00 | —0 – | 4.00 | —0 – |
| Equipment—Capital Assets | 926.86 | 989.41 | 1,013.91 | 1,091.32 |
| TOTAL ASSETS | $20,652.38 | $24,394.26 | $30,999.02 | $40,706.08 |
| *Liabilities* | | | | |
| Federal Withholding Taxes | $ 90.20 | $ 175.20 | $ 208.41 | $ —0 – |
| *Net Worth* | | | | |
| Net Worth—Balance at end of Each Year | 20,562.18 | 24,219.06 | 30,790.61 | 40,706.08 |
| TOTAL LIABILITIES & NET WORTH | $20,652.38 | $24,394.26 | $30,999.02 | $40,706.08 |
| NET INCREASE IN NET WORTH OR SURPLUS DURING YEAR | $ 2,106.65 | $ 3,656.88 | $ 6,571.55 | $ 9,915.47 |

### CASH RECEIPTS AND DISBURSEMENTS DURING EACH YEAR

| | *Year* 1943 | *Year* 1944 | *Year* 1945 | *Year* 1946 |
|---|---|---|---|---|
| CASH RECEIPTS DURING YEAR: | | | | |
| Membership Dues | $10,288.00 | $12,978.00 | $12,636.00 | $16,971.00 |
| Advertising | 7,071.49 | 8,739.31 | 10,814.12 | 15,771.69 |
| Other Receipts | 529.12 | 358.70 | 2,609.83 | 378.40 |
| TOTAL CASH RECEIPTS DURING YEAR | $17,888.61 | $22,076.01 | $26,059.95 | $33,121.09 |
| CASH BALANCE AT JANUARY 1, OF EACH YEAR | 5,189.87 | 3,151.52 | 1,840.85 | 5,457.11 |
| TOTAL CASH AVAILABLE | $23,078.48 | $25,227.53 | $27,900.80 | $38,578.20 |
| CASH DISBURSEMENTS DURING YEAR: | | | | |
| Secretary's Office | $ 5,113.26 | $ 5,718.48 | $ 5,579.68 | $ 6,226.14 |
| N. C. Medical Journal | 7,615.15 | 10,187.93 | 11,922.23 | 13,286.22 |
| Other Operat. Exp. | 2,516.55 | 2,417.72 | 1,845.89 | 3,540.26 |
| Investments, Refunds and Other | 4,682.00 | 5,062.55 | 3,095.89 | 10,794.82 |
| TOTAL CASH DISBURSEMENTS DURING YEAR | $19,926.96 | $23,386.68 | $22,443.69 | $33,847.44 |
| BALANCE OF CASH AT END OF EACH YEAR | $ 3,151.52 | $ 1,840.85 | $ 5,457.11 | $ 4,730.76 |

## SCHEDULE 1—RECONCILIATION OF CASH

December 31, 1946

| | | | | |
|---|---|---|---|---|
| CASH ON HAND | | | | $ —0— |
| THE SCOTTISH BANK—RED SPRINGS, N. C. | | | | |
| Checking Account | | | | |
| Balance per Bank Statement | | | $ 5,732.50 | |
| Less Outstanding Checks: | | | | |
| | *Number* | *Amount* | | |
| | 287 | $ 8.00 | | |
| | 307 | 16.00 | | |
| | 404 | 4.00 | | |
| | 560 | 7.80 | | |
| | 763 | 14.00 | | |
| | 1097 | 54.89 | | |
| | 1099 | 3.60 | | |
| | 1100 | 203.10 | | |
| | 1101 | 27.75 | | |
| | 1102 | 237.40 | | |
| | 1103 | 159.95 | | |
| | 1104 | 107.65 | | |
| | 1105 | 132.60 | | |
| | 1106 | 25.00 | 1,001.74 | 4,730.76 |
| TOTAL CASH AS SHOWN BY EXHIBIT A | | | | $ 4,730.76 |

## SCHEDULE 2—INVESTMENT IN UNITED STATES BONDS

December 31, 1946

| | *Date of Issue* | *Date of Maturity* | *Par Value At Maturity* | *Cost* |
|---|---|---|---|---|
| DEFENSE BONDS—SERIES "F": | | | | |
| No. M75369F | 12-1-41 | 12-1-53 | $ 1,000.00 | $ 740.00 |
| M75370F | 12-1-41 | 12-1-53 | 1,000.00 | 740.00 |
| M75371F | 12-1-41 | 12-1-53 | 1,000.00 | 740.00 |
| M75372F | 12-1-41 | 12-1-53 | 1,000.00 | 740.00 |
| M75373F | 12-1-41 | 12-1-53 | 1,000.00 | 740.00 |
| M75374F | 12-1-41 | 12-1-53 | 1,000.00 | 740.00 |
| M98838F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| M98837F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| M98836F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| M98835F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| M98834F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| M98833F | 1-1-42 | 1-1-54 | 1,000.00 | 740.00 |
| C89019F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89020F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89021F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89022F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89023F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89024F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89025F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89026F | 12-1-41 | 12-1-53 | 100.00 | 74.00 |
| C89818F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89819F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89820F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89821F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89822F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89823F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89824F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| C89825F | 1-1-42 | 1-1-54 | 100.00 | 74.00 |
| SAVINGS BONDS—SERIES "F": | | | | |
| No. M1171281F | 5-1-45 | 5-1-57 | 1,000.00 | 740.00 |
| M1171282F | 5-1-45 | 5-1-57 | 1,000.00 | 740.00 |
| M1236678F | 11-1-45 | 11-1-57 | 1,000.00 | 740.00 |
| M1236679F | 11-1-45 | 11-1-57 | 1,000.00 | 740.00 |
| M1278173F | 1-1-46 | 1-1-58 | 1,000.00 | 740.00 |
| M1278150F | 1-1-46 | 1-1-58 | 1,000.00 | 740.00 |
| M1278151F | 1-1-46 | 1-1-58 | 1,000.00 | 740.00 |
| M1278152F | 1-1-46 | 1-1-58 | 1,000.00 | 740.00 |
| M1338458F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1338459F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1338460F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1338461F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1338462F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1228463F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1372377F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1372378F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1372379F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| M1372380F | 8-1-46 | 8-1-58 | 1,000.00 | 740.00 |
| SAVINGS BONDS—SERIES "G": Interest Rate 2½% payable semi-annually from date of Issue: | | | | |
| No. M1186465G | 12-1-42 | 12-1-54 | 1,000.00 | 1,000.00 |
| M1186466G | 12-1-42 | 12-1-54 | 1,000.00 | 1,000.00 |
| M1376544G | 4-1-43 | 4-1-55 | 1,000.00 | 1,000.00 |
| M1376545G | 4-1-43 | 4-1-55 | 1,000.00 | 1,000.00 |
| M1376546G | 4-1-43 | 4-1-55 | 1,000.00 | 1,000.00 |
| D616518G | 4-1-43 | 4-1-55 | 500.00 | 500.00 |
| M1905733G | 9-1-43 | 9-1-55 | 1,000.00 | 1,000.00 |
| M2355967G | 2-1-44 | 2-1-56 | 1,000.00 | 1,000.00 |
| M2700601G | 4-1-44 | 4-1-56 | 1,000.00 | 1,000.00 |
| M2700600G | 4-1-44 | 4-1-56 | 1,000.00 | 1,000.00 |
| M2772895G | 6-1-44 | 6-1-56 | 1,000.00 | 1,000.00 |
| M2772896G | 6-1-44 | 6-1-56 | 1,000.00 | 1,000.00 |
| TOTAL PAR VALUE AT MATURITY | | | $43,100.00 | |
| TOTAL COST VALUE AT DATE OF ACQUISITION—EXHIBIT A | | | | $34,884.00 |

. . . On motion, duly seconded, the report was accepted unanimously.

### Reports of the Councilors

**First District**—Dr. J. Gaddy Matheson (Ahoskie): Nothing unusual or remarkable has happened in the First District this past year. The First District still makes headlines concerning the so-called marriage mill at South Mills. The laboratory through which went the Wassermann tests that made possible that situation has been surrendered, and I do not think that it will be reinstated.

Seven new members have been added to our First District Medical Society this year, and we are back more or less on a pre-war basis. We plan to have four regular scientific meetings this year.

**Second District**—Dr. J. C. Tayloe (Washington)—No report.

**Third District**—Dr. Donald B. Koonce (Wilmington): The Third District is functioning as usual. We had our regular meeting in the spring and shall have another in the summer, and so far everything is going along very happily down there.

**Fourth District**—Dr. G. Erick Bell (Wilson), reporting for Dr. Newsom P. Battle (Rocky Mount): Dr. Battle asked me to report for him that the societies in the different counties are having regular meetings, with good papers, and that there are no irregularities.

**Fifth District**—Dr. H. A. McAllister (Lumberton), reporting for Dr. J. N. Robertson (Fayetteville): Our membership in the Fifth District is greater this year than last, and the Society has been very active.

**Sixth District**—Dr. M. D. Hill (Raleigh):

I am happy to report that our district meeting was very successful from the standpoint of attendance and scientific program. All county societies are organized and having regular meetings, and harmony and cooperation exist in my district. At present there are no suits or discord among the members to my knowledge.

**Seventh District**—Dr. Elias S. Faison, (Charlotte): With the exception of one county which remains unorganized, it is gratifying to report that all of the county societies in the Seventh District have been holding meetings with presentations of excellent papers. These societies are being well organized, and we feel certain they will be functioning with well rounded programs and continued fine attendance in the future.

**Eighth District**—Dr. J. H. McNeill (North Wilkesboro):

The component societies of the Eighth District are all active, and there has been no major strife in any of the societies. Meetings are being held regularly and excellent programs are being given. All the county societies have cooperated with the Executive Committee in efforts to pass the North Carolina good health program and other medical legislation.

The Eighth District Medical Society has held two meetings. Last fall the doctors of the Elkin group and Surry-Yadkin society entertained us at the Y.M.C.A. in Elkin. The meeting was well attended and the program was excellent. This spring the Forsyth County Society put on a fine program in Winston-Salem. Here too, the attendance and the program were excellent. At this meeting, North Wilkesboro was selected as the fall meeting place.

Several meetings of the Executive Committee were attended by this councilor. During the year, various situations arose that required the attention of the State Board of Medical Examiners and my cooperation with them. They were as follows:

1. Dr. B. O. Choate of Sparta, N. C., was arrested for allegedly performing an illegal abortion. A fatality resulted. I advised the Board of this event and have kept them informed as to the status of this case.

2. One Bruce H. Carraway, a Justice of the Peace in High Point, advertised in the newspapers that he could furnish blood test, doctor's certificate and marriage license within three hours to prospective wedding couples. As this appeared to have the makings of a "marriage mill," the State Board of Medical Examiners requested information on this set-up. This information was obtained and given to the Board and to the State Health Department.

3. In January, 1947, one Ora Mabel Tomas-Fisher, M.D., alias Ora Fisher Logan, M.D. of Rockingham County, was tried and found guilty of "performing abortions and concealing births of babies." She was sentenced as follows:

> ". . . pay the costs of the action and be imprisoned in the State Prison for a term of ten years, and that she surrender at this time her license to practice medicine in the State of North Carolina. Upon her failure to pay the costs and a fine of $2000.00 at this term of court, capias and commitment will be issued within 30 days from this date to put the sentence into effect if she is found in the State of North Carolina at that time or any time thereafter." This physician has turned in her license and is reported to have left the state.

4. The State Board of Medical Examiners has sent to Dr. Theodore Antonakos of Greensboro formal Notice of Hearing and Accusations. He is accused of narcotic addiction. Information in this case was obtained and forwarded to the Board.

**Ninth District**—Dr. I. E. Shafer (Salisbury):

The Ninth District annual meeting was held Thursday afternoon and evening, Sept. 26, 1946, at the Municipal Club in Lexington, with about one hundred present. The afternoon session was given to a scientific program, with several interesting and timely subjects presented and discussed. The dinner meeting was at 6:30 p.m., with Dr. W. B. Hunt serving as toastmaster. Dr. David Cayer of Winston-Salem was guest speaker, and brought a very informative message on "Uses and Abuses of Vitamins." During the business session of the meeting, Dr. W. B. Hunt, president-elect of the Society, presided. Officers of 1946-47 were elected:

Dr. William Davis McLelland—President
Dr. Creighton Wrenn—Secretary.

The 1947 annual meeting of the Ninth District will be held in Mooresville, Thursday, September 25.

On November 20, 1946 a number of the physicians of Ashe and Watauga Counties met in Boone, and reorganized the Ashe-Watauga Medical Society. Officers were elected as follows:

Dr. Dean C. Jones—President
Dr. H. B. Perry, Sr.—Vice President
Dr. Robert R. King, Jr.—Secretary-Treasurer.

The Ashe-Watauga Medical Society has applied to the North Carolina Medical Society for a charter. I am happy to report these two counties have reorganized, and wish to recommend that the society be given a charter, and be welcomed into the Medical Society of the State of North Carolina.

**Tenth District**—Dr. D. M. McIntosh, Sr. (Old Fort):

The Tenth District Medical Society meets twice a year. The society this year has held one regular and two called meetings. The next regular meeting will be held in Asheville on May 28. I am glad to report an unusually good attendance at these meetings. Splendid papers were read, and good spirits and fellowship were much in evidence. The called meetings were held for the purpose of locating in western North Carolina a branch of the State Laboratory of Hygiene. For various reasons this project failed to pass through the State Legislature.

The Madison County Society ceased to function during the war, as most of the doctors went into the armed services. This society was reorganized last winter. Dr. B. O. Edwards, president of the Tenth District Society, and I had the pleasure of meeting with them on that occasion.

There have been a few irregularities in our district, but steps are being taken to straighten them out. On the whole, I am happy to report that conditions in the Tenth District are good.

### Appointment of Committee to Consider the President's Addresses

. . . Upon motion by the secretary, duly seconded and carried, Vice President Bell appointed Dr. Hugh McAllister, Dr. V. K. Hart, and Dr. A. H. London to consider the addresses of President Coppridge to the House and to the Banquet Session, and to report on his recommendations.

### Reports of the Delegates to the American Medical Association

#### San Francisco Session

Dr. Strosnider has suggested that he report on the December meeting of the House of Delegates of the American Medical Association, and that I take the San Francisco session. Since both these meetings have been reported in full in the **Journal of the American Medical Association**, and the highlights given in the **North Carolina Medical Journal**, I will not present a detailed report here.

Nearly all the delegates were present at all meetings of the House of Delegates in San Francisco. Because this meeting was held in San Francisco and because California is in a state of constant insurrection against the A.M.A., there was more electricity in the atmosphere than usual. This reached a climax when Dr. R. L. Sensenich, chairman of the Board of Trustees, offered his report, in which he referred to the famous "Rich report." This, as most of you know, was a summary of the recommendations offered by the Raymond Rich Associates, dealing with the public relations policy of the American Medical Association. Dr. Sensenich stated that the full report could not be presented then, but would be withheld until the December session. At this point there was some obvious objection on the part of the California delegates, and possibly a few others, and the nearest approach to hissing a speaker that I have ever heard in the House of Delegates. A majority, however, voted that action be postponed until the December meeting. As you know, the full report was presented to all the delegates then, and was found to be more of a dud than an atomic bomb.

Another important committee which reported was the Reference Committee on Amendments to the Constitution and By-Laws. This report, however, was only preliminary, and much further work is to be done before the amendments will be ready for presentation.

It was quite gratifying that the reapportionment of delegates gives North Carolina three delegates instead of two.

Another important feature of the San Francisco session of the A.M.A. was the recognition of the Section on General Practice as an official section of the Society, with a delegate to the House. Dr. Griffin, of Graham, Texas, was elected as the delegate from this section.

Your two delegates attended every meeting faithfully, and, I believe, conducted themselves as well as could be expected.

Respectfully submitted,
W. M. Johnson, M.D.

#### Midwinter Meeting

The midwinter meeting of the House of Delegates of the American Medical Association was held in the auditorium of the Home Building, 535 North Dearborn Street, Chicago, December 9-11, 1946. One hundred and seventy-three delegates responded to the roll call.

Dr. Wingate Johnson was appointed chairman of the Committee on Sections and Section Work, and Dr. C. F. Strosnider was appointed a member of the Credentials Committee.

There were many resolutions offered to the house. These were referred to the proper reference committee for study and recommendations. In my opinion the following resolution is of special interest to our society:

"RESOLVED, That the American Medical Association sponsor a national conference of officers of the county medical societies which shall meet yearly just preceding the annual session of the House of Delegates of the American Medical Association for the purpose of bringing to the annual session the diverse problems of the various localities, the exchange of ideas which would be helpful to the state conferences, in such matters as voluntary health insurance plans, hospitalization plans, construction of new hospitals in needed places, and improvement in medical facilities, rural health activities, nursing activities and the activities of the various Councils of the American Medical Association."

A large part of our two-day session was given to studying the contents of the Rich report. After due consideration of the report by the house acting in the capacity of "a committee of the whole" many recommendations were adopted, many rejected, and some referred to a special committee for further study, with the recommendation that a final report be made by said committee to the House of Delegates in Atlantic City, June 9-13, 1947.

The by-laws are undergoing revision by a special committee of the House of Delegates, and this committee's report will be submitted to the House of Delegates in Atlantic City.

The House of Delegates at its December, 1946, meeting changed the by-laws to the effect that any fellow of the American Medical Association, including members of the House of Delegates, can be elected president of the Association.

A resolution was passed authorizing steps to set up a specialty board for the certification of general practitioners.

Numerous other resolutions were acted upon, and have since appeared in the **Journal of the American Medical Association.**

You will be interested to know that the number of members as of December 1, 1946, was 129,145—an increase of 3,674 since December 31, 1945.

Respectfully submitted,
C. F. Strosnider, M.D.

### Election of Delegates to the Tennessee Medical Society

. . . Following brief reports from the delegates to the Medical Societies of Virginia, South Carolina, and Georgia, Dr. B. O. Edwards moved that the Society elect three members as delegates to attend the annual meeting of the Medical Society of the State of Tennessee. The motion was seconded and carried unanimously.

## Report of the Board of Medical Examiners
## April 20, 1946—May 2, 1947

This report is prepared in an effort to give you, the North Carolina State Medical Society, information concerning the activities, problems, and recommendations of your State Board of Medical Examiners. There has never been a time when the difficulties and problems of this state agency have been so manifold and paramount.

The members of your board are:

Dr. Charles W. Armstrong, Salisbury—Examiner in Pharmacology, Pediatrics, Public Health
Dr. M. D. Bonner, Jamestown—Examiner in Chemistry and Physiology, alternating with Dr. Paul G. Parker
Dr. Thomas Leslie Lee, Kinston—Examiner in Obstetrics and Gynecology, alternating with Dr. Ivan Procter
Dr. R. B. McKnight, Charlotte—Examiner in Surgery
Dr. Paul G. Parker, Erwin—Examiner in Practice of Medicine and Therapeutics, alternating with Dr. M. D. Bonner
Dr. Malory A. Pittman, Wilson—Examiner in Anatomy, Histology, Embryology
Dr. Ivan Procter, Raleigh—Examiner in Bacteriology and Pathology, alternating with Dr. Thomas Leslie Lee

They have individually and collectively endeavored to carry out the principles of the Medical Practice Act, and in so doing, the spirit and high standard of the medical profession in this great state.

Probably no legislature prior to the 1947 General Assembly has ever enacted laws so far reaching to improve the health of the citizenship of our great commonwealth. At the same time never have we had so many isolated and threatening movements of legislators which would tend to destroy completely the foundation of the medical profession and the safeguards that it has thrown up for the benefit of all the people against unqualified would-be practitioners. It behooves every member of this Society, and more especially the state, district, and county officers, to be on the alert and to act in cooperation with the Board of Medical Examiners, to the end that we may continue our high standard of professional service by admitting applicants who are eligible through qualification and by keeping out forever those who have not proven through the field of standard preparation and ability to serve the patient in the best manner.

On May 2, 1946, at the regular meeting of the House of Delegates of the State Medical Society, the following resolution on basic sciences was passed:

"The State Board of Medical Examiners asks the House of Delegates to instruct the incoming president to appoint a committee to work with the State Board of Medical Examiners and the Legislative Committee of the Medical Society of the State of North Carolina in preparing such a bill."

Your state board and the committee from this Society studied the eighteen laws now operating in the United States, and prepared a new law for presentation to the North Carolina General Assembly. After much deliberation and consideration, the special and legislative committees decided that it was wise to postpone the introduction of such a bill until 1949, in order that the full support of the state could be given to the Medical Care Program. The same action was taken relating to the requirement of one year's internship for licensure.

The board passed a resolution that physicians on active duty with the Veterans' Administration, United States Public Health Service, and Army and Navy Medical Corps, doing no outside or private practice, are not required to have a North Carolina license. At the same time, commanding officers of veterans' hospitals throughout the state were notified that members of their staff were not permitted to carry on civilian practice nor to diagnose in preparation for testimony in the courts of the state without a North Carolina license.

On several occasions physicians who have served with the United States Army or Navy, but are graduates of grade-B medical schools, have applied to the board for licensure by comity, or permission to take the regular annual written examination. The board has persistently ruled that all applicants must meet the same requirements for licensure, whether or not they have served in the armed forces.

The board is required to give much time at every meeting to consideration of the case histories and the Federal Narcotic Bureau reports on physicians who are afflicted with narcotic addiction. It is the desire and effort of this board to assist these unfortunate physicians in every manner that is practical in order to salvage their lives and rebuild them into useful and reliable practitioners. In this program we are considering a reversal of the unsuccessful policy that has been operative for many years. Instead of the customary word of warning which has been given by this board to many addicted physicians, we believe that revocation of the state license to practice medicine is proper whenever a physician reaches the degree of narcotic addiction that requires prolonged or repeated institutional treatment, as well as disciplinary action by the Federal Bureau of Narcotics. After revocation, or at the time of revocation, the physician will be directed to enter the United States Public Health Service Hospital at Lexington, Kentucky, for adequate treatment. While he is a patient there, the board will receive regular reports from the medical director stating his condition, and prognosis. When the physician's physical and mental condition is satisfactory for a resumption of practice, his license will immediately be considered for reinstatement. We believe that such a policy and action on the part of the board set up an incentive and positive kind of moral code rather than a negative one. The physician has an objective to live and work, rather than a threat of censure and revocation. This plan is advocated by the attorney general of the State of North Carolina, who has given considerable thought to it. The Board furthermore has great faith in the efforts of the Society's special committee to safeguard such physicians from narcotic addiction.

Another very definite problem confronting the board now concerns the management of physicians not eligible for licensure in this state—for example:

1. Grade-B physicians working with other physicians who are now licensed and practicing in North Carolina.
2. Practitioners other than medical doctors who are actually practicing medicine and indirectly admit the same, but who live in isolated areas not attended by a regular medical practitioner.
3. Physicians not graduates of grade-A medical schools.

The participation of two physicians in the so-called Camden County marriage mill came to the attention of the board. A thorough investigation was made by the State Bureau of Investigation and attorneys for the North Carolina Board of Medical Examiners. After a hearing at the Asheville meeting of the board on October 1, 1946, it was concluded that there was not sufficient evidence to present formal charges against the physicians involved. The following letter was written both physicians:

"The North Carolina Board of Medical Examiners has gone into the matter of your alleged participation in the so-called Camden County marriage mill and your professional conduct in the issuance of marriage licenses because of information that has come to its attention which warrants very serious consideration by this board. We consider the charges extremely serious.

"We do not intend to take any final action with regard to these charges at this time, but we wish to warn you that the matter is still pending for future action of the board and is being held under consideration by it. If there is any further action or hearing, you will be given due notice and an opportunity to be heard.

"Any other irregularities reported to us in the future will be investigated to the extent of our ability and charges will be pressed."

On January 16, 1947, the State Board of Medical Examiners held a regular court type of hearing in the case of physician A, who was indicted in the Superior Court of North Carolina on the following charges: fornication and adultery, maintaining a building for prostitution and assignation, and prostitution and assignation. After hearing all of the evidence, including a dozen witnesses, the board issued the following verdict:

"That it does hereby revoke and rescind the license of Dr. A. to practice medicine in the State of North Carolina, provided however, that this order and recision be suspended upon condition that Dr. A. be and remain of good behavior; that he not violate any criminal law; that he be of good moral conduct, and that he practice medicine on a high professional plane and in an ethical manner for a period of five years from this date.

It has been the practice of this board to have an annual audit carried out by a certified public accountant, a copy of which is filed with the secretary of this society.

At the January, 1947, meeting of the board, the following recommendations were made, which preceded any suggestion on the part of the legislature for investigation:

1. Annual registration of physicians.
2. Requirement of one year's internship for licensure.
3. Inclusion in the Medical Practice Act of the injunctive process which will eliminate trial by a jury in the case of irregularity.
4. Registration of all interns in the state.
5. Registration of all resident physicians in the state.
6. That the office of the secretary-treasurer be continued in a most business-like and modern manner; that the office be located permanently in the city of Raleigh. This location is advisable on account of its proximity to other state offices and officers. It is frequently necessary for the secretary to have the suggestions of the attorney general, the State Bureau of Investigation, and the attorneys for the State Medical Society and this board.
7. It is suggested that the board prepare a record giving its history, function, members, requirements, fundamental policies, and so forth.

At the January meeting the board was shocked and saddened by the notification of the death of its immediate former secretary, Dr. W. D. James. An appropriate resolution was drafted and forwarded to the family.

At the recent session of the General Assembly the osteopathic profession introduced House Bill No. 352 as follows:

"A BILL TO BE ENTITLED AN ACT TO AMEND SECTION 90-129 OF THE GENERAL STATUTES OF NORTH CAROLINA DEFINING OSTEOPATHY.

"The General Assembly of North Carolina do enact:

"Section 1. That Section 90-129 of the General Statutes of North Carolina defining Osteopathy be, and the same is hereby amended, by striking out the comma in line three thereof, and inserting in lieu thereof in parenthesis, the following '(except for the alleviation of pain.)'.

"Section 2. That said Section be further amended by substituting a semicolon for the period at the end of said section and adding a proviso as follows: "provided, however, that nothing in this Chapter shall be construed as preventing the suggestion or use by licensed osteopathic physicians of any medical preparation which is purchasable by the general public without a physician's prescription."

"Section 3. That this Act shall be in force and effect from and after its ratification."

Through the concerted effort of the Legislative Committee, the officers of the State Medical Society, the State Board of Medical Examiners, and other physicians, this bill was overwhelmingly defeated.

House Bill No. 299 was introduced in the General Assembly for the purpose of obtaining license on behalf of Dr. John P. Painter. It appeared that this physician graduated from Bennett Medical College in June, 1915; he did not receive his diploma because he was unable to pay the last tuition fee, and the school ceased to function in 1916, before said tuition could be paid. Dr. Painter has been practicing in Jackson County, North Carolina, for thirty-two years under the direction of other physicians. In order to prevent the passage of this bill, the State Board of Medical Examiners agreed to examine Dr. Painter, and, if satisfactory, grant him a limited license to practice in Jackson County, North Carolina. This plan was concurred in by the attorneys for the State Medical Society, the chairman of the Legislative Committee, and the secretary of the State Medical Society.

At the meeting of the board on May 1, 1947, the president of the North Carolina State Medical Society appeared for the purpose of discussing the relationship of the medical profession to licensure and enforcement of the Medical Practice Act. The president further discussed: (1) the problem of foreign graduates; (2) the policy of revocation of license of chronic narcotic addicts. The following resolution was adopted: That certain foreign graduates (four in number) who have applied for licensure are hereby granted the privilege of taking the annual medical examination. If these graduates pass the examination, they will be given a temporary license for a period of one year to practice within the limits of the county in which they reside. During this period of time the North Carolina State Board of Medical Examiners will appeal to and endeavor to procure a grading of foreign schools by the American Medical Association. If the schools from which these applicants are graduated are approved, then they will be given complete license, and if the schools are disapproved, the license will terminate at the end of twelve months.

To summarize, the board has assembled five times in the past twelve months in order to expedite licensure of physicians and on account of the press of business. All members have attended all meetings except one, who was convalescing from a recent illness.

Two hundred and thirty-three applicants were licensed through endorsement of credentials.

Eleven applicants have been refused license for failure to meet the requirements of the board, as follows:

1. Graduates of B-grade medical schools.
2. Graduates of foreign medical schools.
3. Request for reciprocity with the United States Navy.

Two applicants were declined permission to take the written examination, because they were graduates of foreign medical schools.

One license was revoked because of conviction of felony in the Superior Court, and one license was revoked because of conviction of a misdemeanor in the Superior Court.

Five investigations were made by the State Bureau of Investigation at the request of the Board of Medical Examiners, as follows:

One investigation of an osteopath alleged to be practicing medicine.

Two investigations of laymen alleged to be practicing medicine.

Two investigations of irregularities by licensed physicians.

Three hearings were held on account of irregularities by licensed physicians. Four hearings were held on account of narcotic addiction. Four narcotic licenses were revoked by the Treasury Department, and one narcotic addict was hospitalized.

Respectfully submitted,
Paul G. Parker, M.D., President
Ivan Procter, M.D., Secretary-Treas.

. . . A motion to accept the report was seconded and carried unanimously.

### Report of the Member of the Board of Nurse Examiners

I am very happy to report that everything seems to be running along smoothly with the nurses at this time. As you know, a bill was passed in the last legislature to permit the licensing of practical nurses in the state of North Carolina and to establish nursing schools in our hospitals for practical nurses. I feel that this will be a great help in the nursing service of our hospitals. We all know that the nursing shortage has been critical for the past several years and at the present time it does not seem to be improved.

The Board of Nurse Examiners gave licenses to 445 young nurses in September, 1946, 190 in January, 1947 and 104 in May, 1947, making a total of 739 receiving licenses by examinations. Also, we gave 232 licenses by reciprocity, making a grand total of 971 nurses receiving licenses during the past year.

I feel that it is our duty to cooperate and work with the nurses in trying to make their profession more attractive and in this way getting more young ladies to enter the nursing profession.

Respectfully submitted,
Louten R. Hedgpeth, M.D.

### Report of the Medical Advisory Committee to the Industrial Commission

Your Advisory Committee has met twice with the Executive Committee, once with the Special Committee on the Industrial Commission, and once with the Industrial Commission to review the protested medical bills.

For the year 1946, 88,991 medical bills were handled by the Industrial Commission, for which there was a total charge of $1,229,901.38. This was reduced by the commission to $1,133,809.13, which amounts to a total reduction of $96,092.25. This is a 14.5 per cent reduction of all bills rendered, 9.9 per cent of which was due to charges in excess of the published fee schedule, according to the Industrial Commission.

It is of interest to note, however, that of the 88,991 bills acted upon by the commission, only 12,942 of them were reduced. The percentage reduction in these is, therefore, much greater than the 14.5 per cent reduction of all bills handled by the Industrial Commission.

Of the 12,942 bills reduced by the commission in the amount of $96,092.25, only 30 were protested by the physicians. The total charge in those 30 protested bills was $2,679.25 and this was reduced by the commission to $1,432.25—a reduction of $1,247.00. On December 6, 1946, the Advisory Committee met with the Industrial Commission to review these 30 protested bills. At this time 29 of the 30 bills were restored in part by the Industrial Commission. The total additional amount allowed by the commission was $574.25.

This fact seems to justify the conclusion that your Advisory Committee is of but little value to the physicians in helping them to obtain equitable adjustments of reduced fees, since this committee succeeded in having only $574.25 of the $96,092.25 reduction restored to the physicians.

There appear to be three chief reasons for this:

(1) Only a small percentage of the reduced bills are protested, because most physicians are too busy or too disgusted with the administration of medical fees to bother with entering a protest.

(2) The Advisory Committee is incompetent to determine what a fair fee should be for medical service of another physician in another community to a patient on whom we have only meager information as to the nature and extent of his injury or the amount of care he needs.

(3) Your committee has no authority to make the commission allow any additional amount in these reduced bills. In fact, we are placed somewhat in the embarrassing position of going before the commission as beggars to plead with them to restore a part or all of the doctor's reduced fee.

In consideration of the above mentioned facts, your Advisory Committee makes the following recommendations:

(1) That the Advisory Committee to the Industrial Commission be abolished.

(2) That the State Medical Society endorse the report of the Special Medical Committee, with which your Advisory Committee served in a joint capacity in an effort to obtain from the Industrial Commission a satisfactory adjustment and revision of the present fee schedule.

(3) That the Medical Society take immediate and necessary steps to obtain a satisfactory correction of the present inequities in the compensation of physicians by the Industrial Commission.

Respectfully submitted,
A. L. Daughtridge, M. D.
Clarence Gardner, M.D.
J. P. Rousseau, M.D., Chairman

. . . Upon motion, duly seconded and carried, it was decided to postpone discussion of this report until the report of Dr. Murphy's special committee had also been heard.

### Report of the Special Committee on the Industrial Commission

On September 22, 1946 a meeting of this committee, combined with the Medical Advisory Committee, was held in Raleigh. All members were present.

Having elaborated a plan of procedure, the committee had a lengthy conference with the Industrial Commission, during which the desired changes in the administration of the Workmen's Compensation Act were thoroughly discussed. Details having been modified somewhat by discussion, the Industrial Commission agreed to consider the following changes as outlined, in principle, and render a decision within a reasonable time, either with or without further conference with the committee:

(1) An extended and generally increased fee schedule, as previously agreed upon by the entire committee.

(2) The coverage of all items of service unless included in a flat fee.

(3) The privilege of consultation as considered necessary with coverage of consultant's fees.

(4) **Most important of all**—That bills considered satisfactory and according to the fee schedule by the carriers be paid direct without having passed through the hands of the Industrial Commission. Only fees contested by the carriers or the physicians would be referred to the Commission and the Medical Advisory Committee for decision. Thus the presence of a governmental bureau standing between the buyer and the seller would be eliminated.

In spite of repeated urging in person and by mail, the Industrial Commission has not taken any action on the proposed changes and neither has it asked for further consultation with this committee. Early in 1947, however, the Commission did increase the fee for office visits from $1.50 to $2.00.

It would seem that it is the policy of the Industrial Commission to delay any action indefinitely and to attempt to appease and confound the medical profession by excuses and promises.

Since an honest and sincere attempt to negotiate with the Industrial Commission for some reasonable changes in the administration of the Workmen's Compensation Act has been continued for nearly two years without any great effect;

Since the Medical Advisory Committee is impotent in its efforts to secure reasonable compensation for professional services and yet its existence is interpreted as a mark of approval by the Medical Society of North Carolina of the administration of the Workmen's Compensation Act;

Since legal opinion, privately obtained from several competent sources, holds that the setting of professional fees under the Workmen's Compensation Act is unconstitutional;

Since the Supreme Court of several other states have held such setting of fees to be unconstitutional;

Since no case covering the matter of the setting of medical fees by a governmental bureau has ever been taken to the courts in North Carolina;

And since there seems to be no other method to secure justice in the administration of the Workmen's Compensation Act;

Therefore: This committee recommends and urges to the House of Delegates that it proceed as follows:

(1) Withdraw the Medical Advisory Committee.

(2) Authorize the Executive Committee to proceed with such other measures as may be necessary.

(3) Authorize the expenditure of sufficient funds to finance such steps as are decided upon by the Executive Committee.

Respectfully submitted,
G. W. Murphy, M.D., Chairman
Verne S. Caviness, M.D., Sec'y.
Arthur C. Ambler, M.D.
Rowland T. Bellows, M.D.
A. L. Daughtridge, M.D.
Clarence E. Gardner, M.D.
Maurice H. Greenhill, M.D.
Thomas R. Huffines, M.D.
Ben J. Lawrence, M.D.
Frank P. Powers, M.D.
J. P. Rousseau, M.D.
Frank C. Smith, M.D.
Hugh A. Thompson, M.D.

**Supplementary report**

After this report had been prepared for presentation to this meeting, a communication was received from the Industrial Commission proposing a new schedule but refusing any change in the method of administration of the Act. The fee schedule offered by the Commission contained one hundred and twenty-seven new items which would clarify the matter of charges but would not add to professional income. It also contained some increase in nineteen items, but these were not procedures very frequently done. Strange to say, it proposed to reduce six items.

After careful consideration of the proposal from the Industrial Commission it is the desire of this committee that its recommendations remain unchanged.

**Dr. Murphy:** I believe that this is of sufficient importance for me to add a few personal observations which may clarify the matter somewhat. There have been practically no changes in the fee schedule for about seventeen years. Nothing has been done to keep pace with the increased cost of living and certainly not with the tremendous increase in the wages paid to industrial workers. I am convinced that the Industrial Commission as it is now constituted has no desire to negotiate a reasonable agreement with the doctors of North Carolina to solve this problem. I have been told reliably something that will illustrate the attitude of the Commission, and I believe it to be true. You will note in the proposed fee schedule that none of the X-ray fees were increased, and some of them were reduced. One doctor said something to a member of the Commission about it, and the member said: "I found out that one radiologist in North Carolina made $40,000 last year, and we are not going to increase those fees."

We are recommending that the Society withdraw its Medical Advisory Committee and, by token at least, withdraw all official approval of the administration of the Workmen's Compensation Act. This would open the way so that an individual could bring action in the courts of North Carolina in an effort to establish the legal status of this phase of the Workmen's Compensation Act. I do not know, of course, what action the courts of North Carolina would take; I do not know whether such a procedure would be successful, or not; but it has succeeded in nine other states of the Union, and so far as I know no supreme court has held to the contrary.

It is my opinion that no matter what the outcome may be—lose, win, or draw—we must make the effort or else we shall ever be at the mercy not only of the Industrial Commission but of any other government bureau, of which there will be many. If we lose I do not see that we shall really have lost anything; and if we are successful then, of course, down through the years we shall have established a principle which will be an invaluable protection against "the intolerable pestilence of bureaucracy." (I like that phrase.)

All the work your Committee has done during the last two years has had one result. We have had the fee for office visits raised from $1.50 to $2.00. That is what we have accomplished.

. . . Dr. R. B. Davis (Greensboro) requested and was granted the courtesy of the floor.

**Dr. Davis:** If we do nothing else during this entire meeting except settle this one issue we shall have done well. It has been coming up annually, with the same story.

We need not hope to gain anything by appeasing the North Carolina Industrial Commission. I think we should consider seriously, however, whether it is wise to give the North Carolina Industrial Commission a weapon with which to fight back at us. If we destroy the medical advisory committee then the Industrial Commission will come out on the front page of all of our papers with the statement that the North Carolina State Medical Society refuses to cooperate with the North Carolina Industrial Commission in the appointment of an advisory board.

It seems to me that we should send to the Industrial Commission an ultimatum that if they do not accept the fee schedules as prescribed by this Advisory Committee the North Carolina Medical Society will take upon itself the responsibility of treating injured employees and will make a settlement with the patient, the insurance carrier, or the employer, but will have no more dealings with the Industrial Commission

**Dr. A. L. Daughtridge** (Rocky Mount): As a member of the Medical Advisory Committee, I should like to let the delegates know that, as our chairman has said, we are absolutely impotent to do anything before the Industrial Commission. About six or eight months ago I wrote the Commission about a particular case and got this reply back from the executive secretary: "You have a very grandiose idea of what this Committee really is. It is advisory."

I am heartily in favor of the proposals that have been made today, but I should like for the entire House to know something of the pitfalls that are in the way. The Commission has told us that whenever this question is brought to a public issue they are going to publicize some of the unethical conditions they have found in some bills; and I say to you gentlemen, frankly, that some of them will make us blush. Those cases should have been reported to the board of censors in the district, so the doctors could take action. But the Commission is holding those cases back until the Medical Society takes some definite action. Then they will begin mud slinging, but I see nothing else to do but to face it.

It is my frank opinion that all we can do is to have some individual member of the Society institute legal procedure and get a definite Supreme Court ruling on this question. We do not have the legal right to tell the Industrial Commission that we are going to the employee, the employer, or the insurance company to collect our fees; we have to deal with the Industrial Commission. Otherwise we would be breaking the law and might have to go to prison. That fact has been brought out.

This is a very grave matter. I should like to say that I fully support the two reports that have been made and that I think they should be adopted, but not until every member of the House is fully acquainted with what lies before us.

**Dr. Joseph A. Elliott** (Charlotte): It seems to me that this is purely a legal question and that before we take any action whatsoever we should employ competent counsel and be guided by his advice as to just what steps should be taken. I am in thorough accord with the Committee that something very definite should be done, but I think we should not take any action until we have competent legal advice. If the Committee has gotten that advice and knows that this is the best thing to do, then I should certainly agree with them.

**Dr. Harry Winkler** (Charlotte): When we were, some years ago, endeavoring to increase the fees before the Industrial Commission, we had this matter investigated from the legal standpoint; several attorneys told us that we would not have a leg to stand on so long as we had the medical advisory committee and so long as we had an agreement on fees. So I should like to add to the recommendations of the Committee that we withdraw our fee schedule.

**Dr. V. M. Hicks** (Raleigh): I should like to ask Dr. Murphy's Committee how much time they have given to the study of this particular problem this year, with whom they have consulted, and how much deliberation they have given to the details, so that we might be benefited by the work that they have already done.

**Dr. Murphy**: The Committee recommends three things: First, withdraw the Medical Advisory Committee; second, authorize the Executive Committee to proceed with such other measures as may be necessary; third, authorize the expenditure of sufficient funds to finance such steps as are decided upon by the Executive Committee.

This report was presented to the Executive Committee and approved by it at its last meeting. It has been modified a little bit since then. So we think now the thing to do would be to authorize the Executive Committee to take the definite steps rather than to specify a definite punitive action by the House of Delegates. There is a long story back of that.

Dr. Hicks asked how much study we had given to the matter. I have no instrument with which to measure that. We started out about two years ago with the committee selected from all the districts of North Carolina. We spent one or two days in Raleigh discussing the matter, and elaborated a plan of procedure which was presented to the Executive Committee. The Executive Committee adopted it in part but decided that the thing to do was to go to the governor. They invited me down, and we went to the governor and spent an afternoon discussing it with him.

Just before the meeting of this Society last year Mr. Wilson appeared at my office—on the Friday before the meeting was to begin on Monday. They are very expert in keeping us off balance. On that Friday he said that they had the idea of getting rid of Dr. Horton. Dr. Horton is still there, but I will say that I think they have tried to replace him; I will give them credit for that. He said if the Society would appoint a committee the Commission would be glad to negotiate with that committee or some other suitable body. So instead of the Committee's presenting the report as we had planned, we recommended that the special committee be appointed to work with the Advisory Committee and the Industrial Commission.

As soon as the special committee was appointed, we tried to get a date set for a meeting with the Industrial Commission. Finally in September we went to Raleigh for a meeting. Every man on the Committee was present. We spent one entire day, beginning in the morning and continuing until 12 o'clock at night, discussing every item in what we considered to be an equitable fee schedule. Then we spent most of the next day with the Industrial Commission, going over this fee schedule item by item. They promised to do something; but the only thing they did was to raise the fee for office visits from $1.50 to $2.00 last January.

Dr. Coppridge called a meeting of the Executive Committee in April and asked me to come down and present a report. The day before that meeting was to take place I received a copy of the new fee schedule. The Commission raised just a few items and denied everything else. As I said before, they do just enough to keep us off balance.

We have consulted at least two firms of lawyers, one in Winston-Salem and one in Raleigh. Dr. Davis, the thing you advocate—that the Society say that we will not accept these fees and will charge our own fees—is a violation of the law as the Industrial

Commission interprets it at the present time. I do not think the Constitution of the United States or the Constitution of North Carolina would deny any doctor the right to charge what he pleases for his own services. It was the intent of the legislature that passed this act that the fees allowed should be the same as would be charged in any given community for the same service to the same class of individual. That principle has been constantly violated all these years, we know; but that was the intent of the law. Now, these lawyers say this: "If you take this to the courts, then the Industrial Commission will say that the law puts on the Commission the responsibility of allowing a reasonable fee." The Industrial Commission will say: "The North Carolina State Medical Society has a committee to pass on contested bills and the Industrial Commission has cooperated and has taken steps to find out what a reasonable fee is." The lawyers all agree that the very existence of that committee, which is entirely impotent and does not do anything for us, will defeat us before we start. Two committees have recommended that the Advisory Committee be withdrawn.

Dr. Winkler brought up the matter of the withdrawal of the fee schedule. So far as I am personally concerned, I will say that Dr. Winkler is eminently correct. I do not believe that the Industrial Commission or any other government bureau has the right to say what we shall charge for our services and say that it is illegal for us to charge more. I endeavored to persuade my committee that it was a wise step, and if I could not persuade them certainly I could not persuade the Industrial Commission.

Two states in the Union operate without a fee schedule, Virginia and Kentucky; and they get along very well. There the financial transaction is between the doctor and the carrier. If by any chance it could be established that a government bureau does not have the right to set the fee, the fee schedule would be abolished, except by voluntary agreement; and every doctor would have the right to agree to it or not. So what we are working for, Dr. Winkler, is what you recommend—abolishment of these fee schedules.

Dr. Daughtridge spoke about the publicity, and I am afraid that he is right. We should give very mature consideration to this thing, for I think we are headed for some very unfavorable publicity. But we are faced with the choice of that or of throwing up our hands and abandoning this whole thing and putting ourselves at the mercy of the Industrial Commission—and not only of the Industrial Commission but of all other bureaus which may come up in the future.

It is no longer a question of a fee schedule; it is the question of principle.

**Dr. Hicks:** I asked my question of Dr. Murphy because I was certain that he and his committee had done a tremendous amount of work on this proposition and have not accomplished any result that is satisfactory to himself or to his committee. I am satisfied, after hearing him and the others, that the recommendation of this Committee is very wise. I move that the recommendations of this Committee be adopted by the Society.

. . . This motion was seconded from the floor.

**Dr. C. F. Strosnider** (Goldsboro): Has there been any consideration of amending the law?

**Dr. Murphy:** We admit the desirability of amending the Act. However, it would be a tremendous task to amend the Act at the present time. The insurance companies are very powerful in the state; they have the money to spend, and we would have a very powerful combination to fight. In nine states the supreme courts have held that the industrial commissions do not have the right to set doctors' fees. If such a thing should happen in North Carolina—and there is ample precedent for it—our difficulties would disappear. If an individual should undertake legal proceedings in this state to have the constitutionality of the Act decided—or at least to have the constitutionality of the method of administration decided—and that decision should be against us, then we would say the time has come when we should turn as a last measure to amending the Act.

**Dr. Harry Johnson** (Elkin): I offer as an amendment to the motion that the present fee schedule of the North Carolina Industrial Commission be classed as unacceptable to the North Carolina State Medical Society.

. . . The amendment was seconded and accepted by Dr. Hicks and the seconder of the original motion.

**Dr. Verne S. Caviness** (Raleigh): I should like to reword Dr. Johnson's amendment to state that this body go on record as withdrawing any expressed or implied approval of the fee schedule.

. . . This revision was accepted by Dr. Johnson. The motion to accept the three recommendations of the Special Committee on the Industrial Commission and to go on record as withdrawing any expressed or implied approval of the fee schedule was put to vote and carried.

### Report of the Advisory Committee on Maternity and Infancy Welfare

**Dr. Arthur H. London, Jr.** (Durham), Chairman: The Advisory Committee on Maternity and Infancy Welfare has had meetings during the year. Its principal function has been tied up with the Academy of Pediatrics survey. This Academy is trying to improve child-health services throughout the United States. For this reason the Advisory Committee recommends that the Society have a committee on child-health care which will represent the State Medical Society in implementing the program on child-health services of the Academy of Pediatrics.

. . . A motion to accept the report and recommendation was seconded and carried.

### Report of the Advisory Committee to the Auxiliary

**Dr. Rachel Davis** (Kinston), Chairman: The Auxiliary made three specific suggestions to the Executive Committee at its recent meeting in Raleigh. The first concerned the advisability of the Auxiliary's meeting separately from the Society. The second was that the Auxiliary dues be collected by the treasurer of the Society at the same time that the Society dues are collected. The third was that the Society raise a McCain Memorial Foundation Fund to be used to support beds in the state sanatoria, in memory of the late Dr. Paul McCain.

. . . . Secretary McMillan reported that the Executive Committee had voted against divorcing the Auxiliary's meeting from that of the Society, and against the collection of Auxiliary dues by the treasurer of the Society. He stated that a committee was appointed by the Executive Committee to solicit private subscriptions to raise a fund to honor the late Dr. McCain.

Motions to approve the action of the Executive Committee on the first two suggestions were seconded and carried.

**Dr. Donald B. Koonce** (Wilmington): I was appointed chairman of the committee for raising funds to honor Dr. McCain. The original idea was to use the donations for maintaining the McCain bed, and to take any additional money which we were able to raise and have either a bust or a portrait of Dr.

McCain placed in the reception hall of the State Sanatorium. Since that time I understand that the Board of Directors of the state sanatoria and various other bodies have decided to raise funds for an auditorium at the Sanatorium and to call it the McCain Wing. I should like to have a vote on the question as to what should be done with the funds I am raising at the present time.

**Dr. G. Erick Bell** (Wilson): It is not going to take all the money that Dr. Koonce is raising to pay for a portrait or bust, and I think the question now is what to do with the remainder of it. Should it be used as a donation to this memorial auditorium that the Sanatorium Directors have started?

**Dr. Davis:** Since the memorial auditorium is going to be built anyhow, and since the McCain beds do not have sufficient endowment to carry them on continuously but have to be supported by annual subscriptions, I move that the funds over and above the price of the portrait or bust be donated to the endowment fund of the McCain beds.

. . . The motion was seconded, and Dr. Koonce suggested as an amendment that the balance left after the bust or portrait was paid for be turned over to the Auxiliary for the endowment of the bed or what other use they saw fit. This amendment was accepted by Dr. Davis, and the amended motion was seconded and carried unanimously.

### Report of the Cancer Committee

Your committee has had a very active year. Four meetings have been held in Raleigh. More would have been held but for the problem of attendance. The membership of the committee is widely scattered over the state, making it difficult for members to attend.

The primary and ultimate aim of this committee is to put into operation the plan for the attack on cancer in North Carolina as adopted by the House of Delegates in 1945. The first point in that plan was to secure a full-time director of cancer control in North Carolina. The chairman has asked many physicians to fill this position, but as yet none have seen fit to accept. The program cannot go forward until we are able to secure a full-time director. As you will recall, according to the cancer law passed in 1945 our program must be integrated and conducted in conjunction with the State Board of Health. The chairman and the State Health Officer have held several conferences in an effort to get our program under way.

The chief work of the committee for the past year has been in acting as the executive committee of the North Carolina Division of the American Cancer Society. Among the projects considered and approved by the committee are: The appropriation of some $10,000 to Rex Hospital in Raleigh for the establishment of a tumor clinic and the appropriation of $25,000 to the State Board of Health to organize the Department of Cancer Control within the Board in order that North Carolina might be qualified to receive its share of the federal funds to aid in the diagnosis, treatment, and prevention of cancer. As a result of this action the State Board of Health has received about $76,000 from the federal government.

It is the duty of the chairman to approve all funds spent by the North Carolina Division of the American Cancer Society, all expenses and requests for aid for the treatment of indigent patients. This duty entails much time, effort and correspondence. The State Commander consults frequently with the Committee. All policies of the American Cancer Society must be approved by the Committee.

The chairman attended a meeting of the American Cancer Society in Biloxi, Mississippi, in September. Many physicians prominent in the field of cancer and many public health officials were on the program. The theme of the program was education, early diagnosis, and adequate treatment.

In the coming year we hope to secure a director for our program; to have frequent articles in the Journal on the various aspects of cancer, and to make a distinct effort to reduce the number of deaths from cancer in North Carolina.

Respectfully submitted,
T. Leslie Lee, M.D., Chairman

. . . Upon motion, duly seconded and carried, the report was adopted.

### Report of the Finance Committee

**Dr. V. M. Hicks** (Raleigh), Chairman: You have heard the report of the secretary-treasurer and are acquainted with the fact that the Society's finances are in very good condition—the best in the history of the Society.

During the past year I have attended all the meetings of the Executive Committee except one. I have also met with a number of other committees which will report in a short time on the establishment of an executive secretary for the Society. In recent years the Society has been operating with a surplus of about $10,000 a year, which is proof that it will be wise for the Society to embark upon this procedure.

. . . A motion to accept this report was seconded and carried.

### Report of the Committee on Hospitals

The Committee on Hospitals has very little to report in the way of further developments in hospital work during the past year. Many of the problems which have existed in the operation of hospitals since the beginning of the recent war still trouble us.

Chief among these difficulties is the shortage of nurses, which doesn't seem to have abated any during the past year. It is distressing to note that only about 50 per cent of the normal number of student nurses required for the nursing schools of the country was enrolled last fall. The reason most often given for the shortage of student nurses is an economic one. Perhaps the dominant factor is the employment of women in various industries at high wages with little preliminary training. As a matter of fact, after a high school course and three years of training in a specialty, it is little wonder that the modern woman thinks more and more of the matter from an economic standpoint. After all, altruistic and humanitarian impulses do not put flour in the barrel and meat in the larder. The question is, how much more cost for illness will the public bear?

The training of practical nurses as planned in the state of North Carolina bids fair to give marked relief in the nursing situation. An act authorizing the training and licensing of practical nurses was passed by the General Assembly of 1947. The machinery for the training of these practical nurses is being set up now. It is hoped that within the next few months recruitment will start.

The growth of hospitals in our state and over the country at large has been phenomenal during the past fifty years. As a matter of fact, the hospital system stands out as one of the major businesses in the United States today and represents one of the largest investments. Twenty-five years ago most of the hospitals in North Carolina were privately owned. This was the only solution for the pioneer surgeon, and great credit is due him for bringing to many communities in North Carolina hospitalization and specialized services that they would not have had otherwise. Today less than 15 per cent of the hospitals are still privately owned and operated.

The Duke Endowment, under the able leadership of Dr. W. S. Rankin, has been the predominant factor in the growth and change from private ownership and control to public ownership and administration of our hospitals during the last twenty years. These changes, along with the $1.00 a day for charity patients paid by the Duke Endowment, is responsible for great advancement in hospital work in the state of North Carolina.

More and greater changes in hospitalization in our state and nation are in the offing. The passage of the recent bill by the General Assembly of North Carolina for the extension of hospital and medical service in the state, along with the appropriations made and the prospects for appropriations by the federal government in accordance with provisions of the Hill-Burton bill, promise to serve as a great stimulus in the immediate future for larger and better hospitals and medical centers.

The great increase in the hospitalization of sick people can be explained largely on the following grounds: (1) more money in the hands of the people; (2) recognition by the public of better care in the hospitals; (3) lack of domestic nursing care in the homes; (4) training of the modern doctor to work in hospitals; (5) increased availability of hospital facilities and consultant service; (6) prepaid insurance against hospitalization and illness. Among these factors, the phenomenal growth of Blue Cross plans, amounting at present to a membership of more than 26,000,000 in the country at large, is probably responsible more than any other factor. With the building of new hospitals and medical centers and the enlargement of present hospital plants under the proposed medical and hospital extension program, great impetus will be given to hospitalization of sick people in the future.

In closing, we would like to stress the fact that there is evidence of a real disinterest on the part of the medical profession in the administration of our hospitals. This, we feel, is deplorable. Of all people, the doctors should be most interested in the proper operation of our hospitals. It is true that we, as busy professional men, do not have time to look after the major business necessary in the operation of a hospital. Furthermore, we have in recent years well-trained hospital administrators to carry on this work. However, there is a definite relationship between the operation of a hospital and professional and nursing care in the institution. The lack of interest on the part of our profession is shown most clearly at the meetings of the State Hospital Association, which are attended in recent years by very few doctors. If the interest of the doctors could be stimulated to the point that it would be equal to that of the nursing profession and hospital administrators, I am sure that the hospitals would more nearly fulfill their mission to the communities.

In conclusion, your committee wishes to make the following recommendations:

1. That the Medical Society of the State of North Carolina continue to support in every way possible the program of the Medical Care Commission and the extension of medical and hospital service to the people of North Carolina.

2. That the Medical Society of the State of North Carolina join the Hospital Association of the State of North Carolina in endorsing the program for the training and licensing of practical nurses.

3. That the Medical Society of the State of North Carolina encourage the merger of the two Blue Cross plans in North Carolina and that it continue to promote in every way possible the extension of Blue Cross coverage in the state of North Carolina.

Respectfully submitted,
T. W. Baker, M.D.
H. L. Brockmann, M.D.
Fred C. Hubbard, M.D.,
Chairman

. . . A motion to accept this report was seconded and carried, and the meeting was declared adjourned until 8 p.m.

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## MONDAY EVENING SESSION

The House of Delegates reconvened in the ballroom, and was called to order by the president at 8:20 p.m.

### Report of the Committee on Industrial Health

**Dr. Harry Winkler** (Charlotte), Chairman: Your Committee on Industrial Health, consisting of Dr. J. E. Shuler, Dr. Monroe T. Gilmour, Dr. Joseph J. Combs, and myself, has tried to make a survey of the men in the state who are interested in industrial health. There are few men in the state who devote their entire time to industrial medicine. In some of the larger plants a combination of industrial medicine and surgery is in vogue, and many of the men are doing a fine job in their respective plants. The physician who attempts to limit his practice to this work is probably a development of our industrial age, and his problems are problems that are a little aside from the general field of medicine and surgery as most of us have known it. The study of the problems of industrial health is a study of human relations in contacts with employees and, more recently, contacts with labor leaders and labor unions. The man who is interested in these problems must have many more facilities at his command than knowledge of medicine and its diversifications.

Many plants not only provide medical and surgical care for the injured employee, but attempt to provide a health service for the employee and his family as well: and the physician who works in this field must be prepared to render, besides medical service, social service to employees in organized industry. The problems of absenteeism, of food, and actual industrial hazard, all arise in industry; and the physician who is in the field of industrial medicine must be prepared to handle them.

We have an Industrial Hygiene Division as a department of our State Board of Health; and it has done an excellent job, in connection with the North Carolina Industrial Commission, in protecting workmen from various types of industrial hazards. With the introduction of newer industries there must be a continuing effort to be aware of hazards in connection with synthetics and various other products put on our markets.

This Committee, I think, faces a problem of increasing importance. I do not believe that the amount of industry here in North Carolina entitles us to a section on industrial medicine, but your Committee has arranged for Dr. Raymond Hussey, of the Wayne University School of Occupational Health, Detroit, Michigan, to speak on this subject at this meeting. I hope you will all have the opportunity of hearing him.

The American Medical Association is particularly interested in this problem, especially in those places where there is a large concentration of industry. The problem in North Carolina is not sufficiently advanced to worry us, but I think we must be prepared. Your Committee has surveyed the situation as well as it could, and we have a good deal of information available for men who would like to have it.

. . . A motion to accept this report was seconded and carried.

President Coppridge recognized Miss Agnes V. Edwards, executive secretary of the Medical Society of Virginia, and her assistant, Miss Spencer Watkins.

### Report of the Committee to Work with the State Board of Medical Examiners and the Legislative Committee to Study the Basic Science Law

The State Board of Medical Examiners, the Legislative Committee, and your committee from the Medical Society of the State of North Carolina met several times during the year to consider a basic science law for North Carolina.

The general overall committee had as its chairman Dr. Roy B. McKnight, of Charlotte. Dr. McKnight and the secretary of the State Board of Medical Examiners gathered considerable information on basic science laws in other states. Our study revealed that there is a wide discrepancy in the basic science laws in the various states. Many states, medical organizations, and others interested in such a law, now have under consideration an attempt to adopt a law that is uniform in scope for the several states. This movement is being sponsored by the Federation of State Medical Boards of the United States.

We have gathered much information, and your Committee is of the opinion that this state should, at the proper time and when prepared, submit to the legislature a proposed basic science law. This move was considered inadvisable this year because of the many medical matters coming before the legislature. It is anticipated that further study will be made in preparation for presenting such a proposal when the next legislature convenes.

Respectfully submitted,  
C. C. Carpenter, M.D., Chairman  
W. Reece Berryhill, M.D.  
W. C. Davison, M.D.

### Report of the Committee to Work with the State Board of Medical Examiners and the Legislative Committee in Preparing a Bill to Alter the Medical Practice Act so that a Year's Internship Be Required before a Certificate of Licensure Is Granted

Your committee has worked with the State Board of Medical Examiners and the Legislative Committee on matters pertaining to our Medical Practice Act.

The State Board of Medical Examiners already has, under the present Medical Practice Act, authority to require a year's internship before granting a certificate of licensure to practice medicine in North Carolina. This requirement has now been adopted by them.

It appears from a study, however, that our Medical Practice Act needs considerable revision and study to bring it up to date. Our State Board of Medical Examiners is giving thorough and conscientious consideration to that matter, and proposed legislation will be offered when there has been proper study of recommendations that should be made.

Respectfully submitted,  
C. C. Carpenter, M.D., Chairman  
W. Reece Berryhill, M.D.  
W. C. Davison, M.D.

. . . A motion to accept the two reports was seconded and carried.

### Report of the Committee on Legislation

At my request, Dr. M. D. Hill of Raleigh was appointed co-chairman of the Legislative Committee. The work of keeping up with the legislative bills is too much for one busy doctor. I suggest that in the future a chairman and a co-chairman, both living in Raleigh, be appointed in legislative years. I also suggest that at least three members of this committee reside in Raleigh, in order that they may scrutinize and pass on any bill or amendment to a bill proposed by any individual doctor. This would apply particularly to any bill already sponsored by the State Medical Society.

The Legislative Committee and your chairman supported and worked for the Medical Care Program. We defeated, by the unanimous vote of the Health Committee of the House, a bill sponsored by the North Carolina Osteopathic Society, giving them the right to practice medicine in North Carolina. They had retained able legal counsel and had maintained lobbyists in the legislature who, according to the **Raleigh News & Observer**, were paid $3,000.00 for their services. To fight this type of legislation is an expense to the Society, and it has come up regularly every two years since I have been chairman. We have to employ lawyers to counteract their efforts. A properly drawn and a properly enacted basic science law should meet this situation. I had hoped that it would be enacted during this past legislature. Much work had been done on the preparation of the bill by the Committee. For reasons of policy, it was withdrawn at the last minute. There were other bills and conferences engaged in by me which affected the medical profession of North Carolina. These situations were attended to by me and by Dr. M. D. Hill, co-chairman of the Committee. Dr. Hill was always coooperative and helpful in all situations which arose. Our lawyers, Messrs. Smith, Leach and Anderson, gave us their time, support and counsel when and where it was needed. Mr. Willis Smith was most effective in presenting our case against the osteopaths before the Health Committee of the House when the osteopathic bill was presented to them.

I have served as chairman of this Committee for several years. I believe firmly in the democratic system of rotation in office, and ask that I now be relieved of my responsibility as chairman of this Committee. If, by virtue of my experience, I can be helpful to this committee as an advisory member, I will be glad to serve in this capacity.

I incurred an expense of $75.00 for the Society with the Capital Printing Company of Raleigh for copies of all legislative bills which they published. It was requested that this bill be sent to our secretary, Dr. Roscoe McMillan. It is my understanding that our lawyers, Smith, Leach and Anderson, are retained on a yearly fee basis by the Medical Society. I had no other expense.

At all times I had prompt, courteous and efficient cooperation from the members of our Committee. I am grateful to Dr. Roscoe McMillan, our secretary, for his able and willing help which he always gave to me whenever and wherever I called upon him.

I wish to thank the North Carolina Medical Society for their trust, confidence and the honor which they have conferred upon me. It has been a pleasure to serve them as chairman of this important Committee.

Respectfully submitted,  
Hubert B. Haywood, M.D.

**President Coppridge:** There is no person in North Carolina who has served the medical profession any more efficiently for the past ten years than has Dr.

Haywood. He has worked in a number of capacities, and there have been times when many of us wondered how he managed to do all the things that he has done for us. Dr. Haywood has asked to be relieved of the chairmanship of the Legislative Committee. I do not believe there is anyone in the Society who could do any better in that position than Dr. Haywood, but I do feel that he deserves a rest. He is willing to serve in an advisory capacity, and I think we should be very thankful for that.

. . . A motion to accept the report and to make Dr. Haywood advisory chairman of the Legislative Committee was seconded and carried.

The report of the **Committee to study the problem of rehabilitating members of the Society who are addicted to alcoholic and narcotic drugs** was called for, but no report was given.

### Report of the Advisory Committee to the North Carolina Medical Care Commission

**Dr. Hamilton McKay** (Charlotte), Chairman: I have purposely omitted making any written report to this Society. The secretary of my Committee has voluminous records, which are open to any member of the Society and will become part of the Society's permanent files.

During the last three years this Committee has been enlarged on two occasions on the advice of the officers of the Society, with the approval of the Executive Committee. At present the Committee's personnel consists of twenty-eight members of this Society geographically located to cover the entire state of North Carolina. In our work during the last three years we have had only one man on the Committee who dissented in his opinion. He was perfectly honest in questioning the necessity of the expansion of the University Medical School at Chapel Hill; he doubted the need for a third four-year medical school, but he was broad enough not to oppose the whole program on account of that one particular point.

I am very grateful for the support of my fellow members of the Committee and of the Executive Committee and of the other members of this Society who have worked on the matter.

Dr. John Stuart Gaul was elected secretary of this committee in the early part of its work. It was due to his untiring efforts and his executive ability that success was made possible.

. . . A motion to accept this report was seconded and carried.

**President Coppridge:** We will hear next from the Committee to confer with a similar committee authorized by the North Carolina Hospital Association and with the executive vice president of the Hospital Care Association and the executive vice president of the Hospital Saving Association in an effort to bring about a merger between the Hospital Care Association and the Hospital Saving Association.

When the House of Delegates last year directed the appointment of this committee, I selected Dr. Paul McCain as the best man to head it. He met his death while on his way to attend the second meeting of the Committee. I want the House of Delegates to know that Dr. McCain died in the service of this Society, and I should like to have the members at this time rise and stand for a moment in memory of Paul McCain.

. . . The members rose and stood in silence.

**President Coppridge:** You may be seated, gentlemen.

### Report of the Committee on Merger of the Hospital Saving and Hospital Care Associations

Your committee appointed to bring about a merger between the Hospital Care Association and the North Carolina Hospital Saving Association began its work with the late Dr. P. P. McCain as chairman. After the death of this capable and beloved leader we continued, with the addition of Dr. Arthur H. London to the committee. Numerous meetings have been held with officials of the two associations. We believe that good progress is being made.

While we believe that the North Carolina Hospital Saving Association has the proper type of control, being the creature of the North Carolina Medical Society, the North Carolina Hospital Association and the public, it must be remembered that the Hospital Care Association was first in the field and has done an excellent job. It must be remembered, also, that the Hospital Care Association has been and can be a valuable adjunct to the Watts and Duke Hospitals, which largely control it. But in the present circumstances the members of both groups appear to be sensible of the fact that the threat of federalized medicine in the nation and the advancement of our own state's good health program make a united effort to spread voluntary insurance desirable.

Officials of both associations seem agreed that a merger would be of little use unless provision can be made in their policies for the complete coverage of the expenses connected with hospitalization in the low-income group. This would mean that in the low-income group, many of whom would otherwise be charity or at least part-pay patients, the doctors would have to agree to accept the fees agreed upon with the association as full recompense for the care of patients in this group. This would apply only to the low-income group.

In conclusion your committee believes that if the doctors and hospitals in North Carolina demand the merger of these two associations, it will be obtained, provided the doctors indorse the principle of complete coverage of hospitalized illness in the low-income group by voluntary insurance in the merged associations. This we recommend.

Respectfully submitted,
Arthur H. London, M.D.
Roscoe D. McMillan, M.D.
George L. Carrington, M.D.,
Chairman

**Dr. Carrington:** Since this report was written, further progress had been made toward the amalgamation of the two Associations. In the meantime I have had a conversation with the Undersecretary of the Treasury in which he said that, in his opinion, the thing that will come nearest to preventing federalized medicine is taking care of the low-income group. The recommendation our Committee is making to the House of Delegates is that the principle of full coverage for hospitalized illness under a voluntary insurance plan be adopted as a policy.

. . . A motion to accept the report was made and seconded.

**Dr. Julian A. Moore** (Asheville): With inflation and rising costs, how it is possible for an association to give full medical or hospital service based on a policy that was issued when there was a deflation?

**Dr. Carrington:** As I understand it, the Associations are not having so much trouble with the hospital bills as with the bills for professional service. Too often, when a group-insurance policy has been sold to a low-income group to pay $75 for an appendectomy, for instance, the surgeon, after he gets that $75, charges the patient another $50.

. . . A motion to accept the report of Dr. Carrington's committee was carried unanimously.

### Report of the Committee to Study Ways and Means of Establishing an Executive Secretary

A committee of three, composed of Dr. George Erick Bell, Dr. J. Street Brewer, and Dr. Roscoe D. McMillan, was appointed by President Coppridge, for the purpose of securing a full-time secretary for the North Carolina Medical Society.

The first meeting of the committee was held on Saturday, June 29, 1946, in Raleigh, in session with the Finance Committee. The advisability of securing a secretary on a full-time basis was discussed. It was decided at this meeting that it was essential that one be employed. The Finance Committee expressed their confidence that the money could be secured for this purpose.

On Sunday, June 30, 1946, our committee's report was made to the Executive Committee, recommending that a full-time secretary be employed.

After a lengthy discussion the following motion was offered by Dr. Donald M. McIntosh, Sr.:

"RESOLVED: That the office of Secretary-Treasurer of the Medical Society of the State of North Carolina be retained and that the Committee to Study Ways and Means of Establishing a full-time executive secretary, composed of Dr. George Erick Bell, Chairman, Dr. J. Street Brewer, and Dr. Roscoe D. McMillan, be authorized and empowered to select and employ an executive secretary for the Society at a salary to be fixed by the said Committee and approved by the Finance Committee."

The motion to adopt the resolution was seconded by Dr. Frank Sharpe and was carried without a dissenting vote.

Letters were written to the twenty-nine state societies in the Union already employing full-time secretaries for the purpose of obtaining information from them as to the duties, salaries, and other pertinent facts regarding their secretaries. Lengthy reports were received from a majority of these societies, and it was ascertained that salaries range from around $5,000 to $7,000 per annum and that these societies are well satisfied with the results of this system. The deans and presidents of most of the North Carolina colleges were requested to make recommendations of eligible persons for this position. Although much interest was shown by them, we did not meet with any success from this source.

During the year we had several recommendations from different members of the Society, and in each instance their recommendations were followed up; however, we found that the prospective applicants were not interested or not available.

In December, 1946, the committee interviewed two young men in a meeting held in Raleigh, North Carolina, at the Sir Walter Hotel. Neither of the applicants was approved by the committee.

In March, 1947, the chairman asked the president to appoint additional members to the committee, thereby giving us a better coverage of the state and enhancing our chances of finding a qualified man. This request was granted, and at that time Dr. Frank A. Sharpe of Greensboro, Dr. Monroe T. Gilmour of Charlotte, Dr. Zack D. Owens of Elizabeth City, and Dr. Lenox D. Baker of Durham, were added to the original committee.

The new committee met in Raleigh on April 12, 1947, at the Sir Walter Hotel. At this time we interviewed six applicants. After a very thorough investigation of their records and qualifications, it was the unanimous opinion of the committee that Mr. E. L. Swindell of Durham should be offered the position at a salary of $4,800 per annum, plus a travel allowance. Mr. H. C. Cranford, also of Durham, was their second choice.

Mr. Swindell returned to Raleigh the following day to meet with the Executive Committee, and it was also the unanimous opinion of this committee that he should be offered the position. The following week a letter was received from Mr. Swindell stating that, because of his health, he had been advised by his physician not to accept the position.

On Saturday, April 27, 1947, a meeting was held in Wilson for the purpose of interviewing applicants. Mr. H. C. Cranford was the choice of the committee at this meeting, and he advised us that his decision would be given within the next four or five days. A telegram from Mr. Cranford was received on May 3, 1947, stating that he would be unable, for various reasons which he enumerated, to accept the position.

At this date it was too late to attempt to call our committee together for further investigations. The committee, therefore, recommends that a committee be appointed to continue the work that has been started until it is successful in securing the services of a qualified person to fill the position of full-time executive secretary for the North Carolina Medical Society.

Respectfully submitted,
George Erick Bell, M.D.,
Chairman

. . . A motion that the report be accepted was made and seconded. After some discussion it was passed unanimously.

### Report of the Committee on Mental Hygiene

The Mental Hygiene Committee has been very active during the past year. We have been working as a liaison committee to correlate the work of the State Mental Hygiene Society and the State Neuropsychiatric Association. It has been our policy to coordinate the activities of these two organizations with any other organized body of psychiatrists and neurologists approved by the State Medical Society. At the request of the two named societies, we have worked as a special committee to establish a psychiatric training service throughout the state. In an effort to establish this service, several hundred questionnaires were sent out to all interested people and groups of people in the state. These have been compiled and turned over to the Social Service Department of the University of North Carolina. The Committee also met with Dr. Fink, the chancellor and dean of the University of North Carolina, about this matter. Since this meeting, the University has applied to the American Society of Psychiatric Case Workers for accredited approval, and they hope to have the program under way this fall.

You will recall that the chairman of this Committee introduced a resolution to this group last year that a Section on Neuropsychiatry be set up in the State Medical Society. We have had several meetings about this section and are sure you all agree that a good program has been arranged and that the section is getting off to a good start.

Two of the members of this Committee have been working with the State Mental Health Council, which was created by the 1945 legislature. This group has had two meetings, the first of which was concerned with the election of officers and the selection of committees. There was also some discussion of possible legislative changes. At the second meeting, the Council voted to give its endorsement to several items. These included the request of the Department of Education for the establishment of a Division of Special Education within the Department; the request of the Department of Public Welfare for a full-time secretary for the State Eugenics Board; and a proposal that some provision be written into the law whereby the Clerk of Court may, on the testimony of one or more practicing physicians, discharge a guardian who has been appointed by reason of a person's commitment to a state hospital or a private hospital for mental cases, or to the state school for the feeble-minded. Several other suggested legislative changes, having to do with the holding of mentally disordered persons for a limited period of observation and care, and with the working out of reciprocal agreements with other states concerning the transfer of patients, were referred for further study.

The function of the Council is to determine where the division of function lies between all agencies participating in all programs devoted to the mental health of the people of North Carolina; to study needs for new legislation pertaining to mental health of the citizens of the state; and to consider ways and means to promote mental health in North Carolina.

Respectfully submitted,
Allyn B. Choate, M.D.,
Chairman
David Young, M.D.
Malcolm Kemp, M.D.

. . . A motion that the report be approved was seconded and carried.

### Report of the Committee on Postgraduate Education

The activities in postgraduate education during the past year have been carried on largely through the efforts of individual institutions and groups rather than through those of this Committee. This is a natural and healthy development and should be encouraged. There has been a gradual resumption of most of the annual symposia and meetings of the prewar period, with great interest manifested by a large attendance of physicians. As was the case last year, the greatest effort has continued to be directed along the lines set up by the Postwar Planning Committee of offering all opportunities possible for continuation and "refresher" training for returning members of the medical corps of the armed services.

In clinical work the two teaching hospitals, as well as others approved for intern and resident training, have been crowded with former servicemen. There are entirely too few positions approved for graduate training in North Carolina hospitals even to begin to meet present demands. The basic science departments of the three medical schools have had more demands for training than they can adequately handle. Unfortunately, the overwhelming majority of the younger doctors now taking graduate work are preparing for the various specialties. Relatively few are interested in general practice, in which field there is the greatest need at present and perhaps the greatest opportunity. The solution of this problem involves many factors—educational, economic, social, and professional—most of which are outside the province of this Committee.

During the year the following excellent graduate meetings or symposia have been held for physicians in this and other states, in each of which the programs have been stimulating and the attendance large.

1. In July the Southern Pediatric Seminar at Saluda for two weeks; attendance 130.
2. In early October the Duke Medical Symposium for two days; attendance over 600.
3. In late October the Matheson Foundation Medical Lectures for two days at Charlotte; attendance 366.
4. In February the Watts Hospital Medical and Surgical Symposium for two days; attendance approximately 600.

In addition, the Committee would like to call to the Society's attention the weekly opportunities, at present poorly utilized by the profession, at the two teaching hospitals—Duke and the North Carolina Baptist—to attend lectures, clinics, ward rounds, and clinicopathologic conferences. It is to be hoped that more and more physicians will take advantage of the services available at these institutions, at which they are cordially welcome.

While every opportunity must and will be made available for the continued training of returning medical officers, at the same time it is our feeling that for the immediate future a concerted effort must also be made by the Postgraduate Committee, the three medical schools, the hospitals, and the individual county and district societies to provide opportunities for physicians who have not been in service and who for the most part have had little opportunity for any graduate or "refresher" work for the past five years. The four symposia mentioned above will be given again this year.

The Duke and Bowman Gray Schools with their teaching hospitals will continue to offer opportunities for special or general work in all fields for varying periods of time, as well as the weekly lectures, clinics, and conferences already mentioned. The University Medical School and the Extension Department will resume the prewar program of postgraduate lectures and clinics in various towns of the state during the fall, winter, and spring months. By utilizing the faculties of the three medical schools and, as in the past, by securing distinguished men from other sections as well, it should be possible to carry professional stimulation to the busy practitioners in the state.

Through a grant from the Children's Bureau, the State Health Department and the University School of Public Health again hope to offer graduate work in obstetrics and pediatrics during the coming year.

Respectfully submitted,
W. R. Berryhill, M.D., Chairman
C. C. Carpenter, M.D.
Verne S. Caviness, M.D.
W. C. Davison, M.D.
Elias S. Faison, M.D.

. . . A motion to accept the report was seconded and carried.

### Organization of the Nominating Committee

. . . A short recess was taken, during which the delegates from the different districts elected their members of the Nominating Committee. Following the recess, Secretary McMillan reported the names of the members elected:

First District—S. A. Saunders, Aulander
Second District—Karl B. Pace, Greenville
Third District—J. B. Sidbury, Wilmington
Fourth District—A. L. Daughtridge, Rocky Mount
Fifth District—L. R. Hedgpeth, Lumberton
Sixth District—M. D. Hill, Raleigh
Seventh District—J. A. Elliott, Charlotte
Eighth District—H. R. Parker, Greensboro
Ninth District—Ross S. McElwee, Statesville
Tenth District—B. O. Edwards, Asheville

President Coppridge appointed Dr. M. D. Hill of Raleigh temporary secretary of the Nominating Committee.

### Report of the Committee to Cooperate with the Council on Medical Service and Public Relations of the American Medical Association

**Dr. Wingate M. Johnson** (Winston-Salem): We have no formal report to make. As chairman of the Committee I wrote to the chairman of the A.M.A.

Committee, Dr. E. J. McCormick, and told him that we would do anything they wanted us to. He replied that he knew the North Carolina physicians would do their duty. That is all we have to report.

. . . President Coppridge then presented Dr. Stuart Willis, recently elected director of the North Carolina tuberculosis sanatoria.

**Dr. Willis:** I come back to North Carolina with a great deal of interest but also with a sense of sadness, because of the circumstances of which you are well aware. Dr. McCain was a very good friend to the members of this Society and to many people beyond the realms of this Society. The work that he did is a challenge to anyone, and it is only in the knowledge that his associates in the work he carried on for many years are going to continue their cooperation and helpfulness that we can in any way hope to succeed.

### Report of the Hospital Saving Association

This eleventh annual report of the Hospital Saving Association is a brief summary of the biggest and most successful year in its history. During 1946, 53,617 new members were enrolled and 67,982 new subscribers added surgical and obstetric benefits. The year closed with a total of 312,991 members, 178,889 of whom were protected by the combined program. By the end of April of 1947 these figures ran well over 330,000 and 200,000 respectively. Over 12,000 surgical and obstetric claims were paid to physicians and there were nearly 33,000 hospital admissions. Well over one and one-half millions of dollars were paid in claims. It is interesting to note that the four general headings of tonsillectomy, maternity, appendectomy, and gynecology accounted for 67 per cent of the total professional claim payments.

Your Association's activities for the year, in addition to its regular duties, centered around the Good Health Program for the state and the program of home care for veterans. Hospital Saving Association is always interested in and concerned with the improvement of the health and better health facilities for the people of North Carolina.

The veterans' program will be reported in detail by a special committee. This program has far-reaching significance, and your Association has, against almost insurmountable odds, endeavored to make it work. It will continue to do so as long as this Medical Society says it is needed.

Numerous meetings referable to the merger of the two Blue Cross plans have been held. It is my hope and belief that some progress has been made. Dr. George Carrington's committee reported on the details. There has been a request for a fact-finding group of experts to study the project. Although your Board of Directors felt that this was unnecessary expense, they have been willing to go to any reasonable length to accomplish this merger. The one thing we felt we were instructed to maintain was the basic structure of the Board of Directors. We considered this essential to a balanced health program in the state.

Within the past year each county medical society was requested to appoint what was designated as a Blue Cross Committee. It was felt that this would serve the useful purpose of helping to solve mutual problems. It has already shown itself to be valuable on several occasions. There are at present, however, forty-nine county societies which have not appointed this committee. May I urge that the respective societies appoint their own Blue Cross Committees as soon as they can conveniently do so.

Among the many big problems facing medicine and the medical profession today is the very critical problem of the economics of over-all medical care for that great bulk of the population generally referred to as the "laboring" and "white-collar" classes. Embodied in this problem is the heart of the very real threat of federalized medicine. The voluntary prepayment principle, with organized medicine providing the active, constructive, and positive leadership, is, I believe, the logical answer. In this, as in all other related matters, the Hospital Saving Association stands ready and anxious to serve and comply with instructions of this Society.

Respectfully submitted,
E. McG. Hedgpeth, M.D.,
Medical Director

. . . A motion to adopt the report was seconded and carried.

### Report of the Editorial Board of the North Carolina Medical Journal

**Dr. Wingate M. Johnson** (Winston-Salem) Editor: Our chairman, Dr. Paul Ringer, was unable to attend the meeting because of illness. I wish to thank the members of the Society for the help they have given us in getting out the **Journal.** It is your **Journal,** and your cooperation and help have made it what it is. We have had wonderful cooperation from the Society as a whole.

. . . The report of the **Conference Committee on Crime and Psychiatry** was called for, but no report was given.

### Report of the Committee to Cooperate with the National Physicians Committee

Your committee appointed to cooperate with the National Physicians Committee for the Extension of Medical Service had an active year fighting federalized medicine in general and the Wagner-Murray-Dingell bill in particular. The National Physicians Committee did a great job. Organized medicine and the lovers of liberty in this country owe much to them.

The complexion of the present Congress is much better. The leading bills being presented to it dealing with medical subjects have been much more friendly to organized medicine and the authors appear inclined to be guided by the advice of recognized medical leaders.

The group of bureaucrats who have been largely responsible for the propaganda favoring federalized medicine, however, have been able to improve their position. The Childrens Bureau has been moved from the Department of Labor to the Federal Security Agency. This adds Katherine Lenroot, its chief, and Martha Elliott, its associate chief, to the same agency with other top proponents of nationalized medicine—Watson Miller, Federal Security Administration; Arthur Altmeyer, Social Security Commission; Isidore S. Falk, **et al.** One of these, Nathan Sinai, has been in Honolulu working on a plan to establish a Territorial System of Health Insurance.

This group never says die. They failed to put a compulsory system of medicine across nationally, so now they are working territorially. They can be expected to try it in states, and again nationally. Much of the endeavor will be by small encroachments anywhere and everywhere—until or unless they can do it in one big project similar to the Wagner-Murray-Dingell attempt.

There are so many bills and maneuvers aimed in the direction of nationalization of medicine that physicians will be forced to keep a paid full-time staff constantly employed to watch these legislative maneuvers and be prepared constantly to fight to preserve an unshackled system of medical practice.

G. Westbrook Murphy, M.D.

Arthur L. Daughtridge, M.D.
George L. Carrington, M.D.,
Chairman

. . . A motion to adopt the report was seconded and carried.

Dr. Fred C. Hubbard, chairman of the **physician members of the North Carolina Medical Care Commission**, presented Dr. John A. Ferrell, executive secretary of the Commission, who gave the following report:

### Report of the North Carolina Medical Care Commission

The North Carolina Medical Care Commission was created March 21, 1945, by an act of the State Legislature. It is composed of eighteen voting members and two non-voting, **ex officio** members. Eight members are nominees of unofficial agencies, and ten are appointed by the Governor to represent other interests.

Members:

3 Physicians—nominated by Medical Society of the State of N. C.
1 Hospital Executive—nominated by N. C. Hospital Association
1 Dentist—nominated by N. C. Dental Society
1 Nurse—nominated by N. C. Nurses Association
1 Pharmacist—nominated by N. C. Pharmaceutical Association
1 Representative—nominated by Duke Foundation
10 Members appointed by the governor from the fields of agriculture, industry, labor, etc.
1 State Commissioner of Welfare, **ex officio**, without voting power
1 Secretary of State Board of Health, **ex officio**, without voting power

The nominees of the North Carolina State Medical Society are:

| | Term of Office | Term Expires |
|---|---|---|
| Dr. W. M. Coppridge | 2 years | July 1, 1947 |
| Dr. J. Street Brewer | 2 years | July 1, 1949 |
| (Successor to Dr. Paul Whitaker—resigned) | | |
| Dr. Fred C. Hubbard | 4 years<br>(Reappointed) | July 1, 1950 |

Other physicians on the Commission are:

| | Term Expires |
|---|---|
| Dr. W. S. Rankin of the Duke Foundation | July 1, 1949 |
| Dr. Carl V. Reynolds, State Health Officer, **ex officio** | |

It may be noted that five members, or 25 per cent of the Commission members, are physicians. Physicians from the start took an active part in the health program that led to the establishment of the Commission. It will be remembered that a State Hospital and Medical Care Commission was appointed by Governor Broughton February 28, 1944. It was composed of 60 members, fourteen of whom were physicians. It was headed by Dr. Clarence Poe, and operated as a whole and through seven committees. It functioned until July 27, 1945, when the Medical Care Commission, created by the Legislature March 23, took over the program.

The objectives of the first Commission—1944-45—were:

(1) "To arouse the people as to existing health conditions and needed remedies."
(2) To secure needed state legislation and funds.
(3) To survey the state's hospital resources and needs.
(4) To support federal legislation — Hill-Burton bill—and appropriations.

It should be a source of keen satisfaction to the sixty members of this original Commission, who gave very liberally of their time, talents, influence, and funds, that all the objectives have been realized.

The present Medical Care Commission was organized July 27, 1945, with Mr. James H. Clark as chairman and Dr. Clarence Poe as vice chairman. The members were grouped into eleven committees:

I. Executive Committee
II. Committee on Acceptance of Gifts
III. Committee on Construction and Enlargement of Local Hospitals
IV. Committee on Contribution for Indigent Patients
V. Committee on Hospital Care Associations
VI. Committee on Legislation
VII. Committee on Medical School Expansion of University of North Carolina
VIII. Committee on Medical Student Loan
IX. Committee on Medical Training for Negroes
X. Committee on Nursing Service and Training
XI. Committee for Report to Governor and General Assembly

In compliance with the federal and state hospital laws, the governor appointed a State (Hospital) Advisory Council to the N. C. Medical Care Commission. It consists of five members, all appointed for terms of four years or to July 1, 1950. Its function will be to serve the Commission in an advisory capacity in matters relating to hospital construction, equipment, maintenance, and operation.

The following brief outline of the Commission and its organization will reflect to some degree its functions and objectives. The legislative act (H.B. No. 594, ratified March 21, 1945), which established the Commission, designated specifically two immediate tasks:

First, arrange for a survey by an accredited group whose members are experienced in the fields of medical education and medical care regarding the need of a University four-year medical school and if needed to recommend its location. A National Committee for the Medical School Survey was appointed in the fall of 1945. It consisted of seven members. Its activities continued through June, 1946, when it recommended, along with other measures, "that the Trustees of the University of North Carolina establish a four-year school of medicine situated on the campus of the University at Chapel Hill."

Second, conduct a survey of each county in the state to determine:

(a) The hospital needs of the county or hospital area.
(b) The economic ability of the county or hospital area to support adequate hospital services.
(c) The state assistance necessary toward hospital construction and equipment.

This task began January 1, 1946, under Mr. Lee C. Gammill, executive secretary who resigned February 10, and was continued under the supervision of Dr. C. C. Clay from February 3, 1946, to August 16, 1946, when he resigned. It was continued by the Commission's office staff and concluded shortly after the present executive secretary reported for duty October 1, 1946. The survey schedules of 175 hospitals were processed tentatively by the Commission's staff and more completely by the American

Hospital Association at its headquarters in Chicago. The analysis still requires minor corrections, but the following figures are approximately correct:

1. Of the 100 counties in the state, 31 have no general or allied hospitals and the remaining 69 counties have 145 general and allied hospitals designed to accommodate 9,214 beds of which 7,591 are for whites and 1,623 for Negroes. This represents a ratio of about 2.7 beds per thousand population, whereas the aim of the national hospital program is at least an average of 4.5 beds per thousand population, or 15,063 for the state, of which 10,877 should be for whites and 4,126 for Negroes. The bed shortage is about 6,849, exclusive of the obsolete and substandard beds which should be declared as unacceptable and abandoned.
2. There are 7 mental hospitals in the state, 3 of which are state-owned. Four are local and privately owned and operated. The three state hospitals were designed to accommodate about 8,000 patients. The beds in other hospitals number 180. Combined, the beds for mental patients give a ratio of about 2.4 per 1.000 population, whereas the national goal is at least 5.0 per 1,000. With the acquirement of Camp Butner with its 3,374 beds, the situation has improved; but more than 1,500 additional beds will be needed to provide 4.0 beds per 1,000 population.
3. Tuberculosis: By U. S. Public Health Service standards, there should be at least 3,490 beds in the state, whereas only 2,339 are available, leaving a need of about 1,100 new beds.

These preliminary figures will be corrected and published in due course. It is sufficient here to state that the shortage of hospital beds in the state is vast and that an extensive construction program lies ahead. The program will require a great deal of time and the expenditure of large sums of money.

The state's overall plan for hospital construction as required by the Federal Hospital Act is being prepared. Two very important features are being studied. One is an equitable schedule for the allocation of state funds to counties on the basis of the needs and the economic resources of the county. The other involves the priority schedule of hospital projects for the next five years in accordance with the law, rules and regulations of the federal government. It is expected that there may be revisions of the priority schedule from time to time to meet the needs and to avoid having funds revert. Each approved project will be given a place on the schedule and a time limit in which the local authorities may satisfy the financial and other conditions. Failure of a local board to exercise its option will give the next project scheduled its chance for aid. Application blanks for use by local hospital authorities are not yet available and are not expected for six weeks and not until Congress makes funds available. When available, they will be supplied by the Commission on request.

Other features of the Commission's program may be commented upon briefly. The Committee on Acceptance of Gifts reports that no gifts have been solicited or received. The Committee on Construction and Enlargement of Local Hospitals, of which Dr. Rankin is Chairman and Dr. Reynolds is a member, is actively at work studying the Commission's state plan and the plans of the local hospital boards. At present, the activities are directed mainly toward preparing a program for a five-year period. The Committee on Contributions for Indigent Patients has formulated policies and the Commission has adopted a cooperative program with the state and county welfare departments. The latter certify indigent patients to approved hospitals. An appropriation of $500,000 yearly was made by the 1945 legislature for this work, but the use of the fund was subjected to legislative conditions which delayed its availability until October 1, 1946. The 1947 legislature believed that the appropriation was larger than would be needed, and reduced the amount to $350,000 yearly. To date, 88 hospitals have been approved by the Commission and are now receiving one dollar per day for each certified indigent patient. The 1947 state law limited payment for the care of indigents to hospitals publicly owned and to hospitals operated by non-profit corporations. A few hospitals are operated by non-profit corporations, but the property is leased from private owners. The 1947 legislature waived the "owned" requirement in such hospitals until July 1, 1949. The leased hospitals are not eligible to receive state or federal grants toward the cost of enlargements or equipment. The Committee on Hospital Care Associations has considered it desirable to encourage a merger of the two larger associations in the state before attempting to stimulate a movement for a wider purchase of hospital care insurance by the masses. Conferences relative to merger possibilities have been held by the Chapel Hill and Durham Associations, but no agreement has been reached.

The Committee on Legislation successfully sponsored minor amendments in the basic law, H. B. 594, which created the Commission. Moreover, it secured the enactment of a hospital-licensing law to be administered by the Commission. Licensing is required of all hospitals that are eligible and apply for state and federal aid for hospital construction and equipment. Other hospitals may voluntarily ask to be included under the licensing act. The administrative machinery to carry out the licensing measures will be set up within a few months, and minimum standards for the operation of licensed hospitals will be adopted.

Another important and comprehensive addition to the hospital laws of the state is an enabling act that permits the state, counties, cities, towns, and townships, separately or jointly, to raise funds by appropriation, tax levy, or bond issue for the building, equipment, maintenance, and operation of hospitals. This applies to hospitals that are publicly owned and to those that are owned and operated by non-profit corporations. The enabling act and the hospital licensing act were adopted substantially as recommended by the Council of State Governments. It is hoped that the Commission, in due course, will be able to print a booklet containing the more important laws or abstracts of them relating to hospitals and that can be furnished upon request.

A change was made in the section of the law relating to the medical student loan fund of $50 000. Its provisions were broadened to apply to students of medicine, dentistry, pharmacy, and nursing to attend any recognized school anywhere that is approved by the Commission. The Committee on Student Loans is now formulating a program and policies for the broadened program. Owing to the government's program of financial assistance in the education of persons who served in the armed forces, there have been few applications for medical student loans. The applications are now increasing in number, and measures for the recruitment of North Carolina students are being planned. Already the deans of the three medical schools in the state have jointly prepared a statement addressed to college and high school students relative to the possibilities for training and careers in medicine, nursing, and medical technology. The pamphlet should be ready for distribution soon.

The work of the Committee on Medical School Expansion of the University of North Carolina has already been reported.

The Committee on Medical Training of Negroes has considered possibilities but decided to defer definite action until the plans for a four-year medical school and teaching hospital at Chapel Hill were settled.

The Committee on Nursing Service reports that the 1947 legislature made provision for the annual registration of nurses in the state and for practical nurses and for facilities to train, examine, and register them. It will now become possible to determine the state's nursing resources and to enlarge them.

The Committee for Report to the Governor and General Assembly, headed by Chairman Clark, has worked effectively. Aside from the legislation above mentioned, it is pleasing to report that the 1947 legislature appropriated to the Commission $6,250,000 to be expended during the biennium beginning July 1, 1947, and for use in matching federal (Hill-Burton) funds for hospital construction, and $61,520 annually for the next biennium for general and administrative expenses. Also, $5,290,000 was appropriated to the University for the expansion of its two-year medical school to a standard four-year medical school and for building a 400-bed teaching hospital. To the Mental Hospitals Board, the legislature appropriated approximately $5,413,526 for the expansion and rehabilitation of the three state mental hospitals, and $1,500,000 for the purchase of Camp Butner hospital with its 3,374 beds—or a total of nearly $7,000,000 for mental hospitals. To the Tuberculosis Hospital Board, approximately $1,700,000 was appropriated for expansion and rehabilitation of the three state hospitals. An appropriation of $53,500 was made to the State Orthopedic hospital for permanent improvements. The teaching hospital at the University, the state mental and tuberculosis hospitals, and the orthopedic hospital will be eligible for federal aid toward construction of approved projects submitted through the Medical Care Commission.

The Commission is now endeavoring to complete the state plan which will be submitted for the approval of the federal hospital agency. It has added to its staff three technically trained persons: (1) an architect, (2) a hospital administrator, and (3) a hospital analyst. Thus it will be prepared to handle applications for aid to hospital construction expeditiously as soon as federal and state funds become available. It is not yet feasible to designate a date when all the conditions will be satisfied, but it is hoped that projects can be considered in July. Those county hospital areas that are organized or that have had hospital experience are eager to submit proposals. About 34 communities report having available more than $8,000,000 as the local share of the cost of local hospital projects. Those 31 counties without hospitals generally are not organized. The Commission hopes to aid them, when requested, to organize and study possibilities. When a course of action is decided upon, a fund-raising campaign will be started.

In conclusion, it is pleasing to report substantial developments. North Carolina is numbered among the states which have made greatest progress in the hospital movement. Credit for this program is due a large number of individuals and agencies. A list of all would be too long for presentation here. Those not mentioned will understand and excuse us if we cite only the five following agencies:

(1) The North Carolina Hospital and Medical Care Commission, 1944-45
(2) The State Medical Society
(3) The State Hospital Association
(4) The Duke Endowment
(5) The Good Health Association, Inc.

John A. Ferrell, M.D.
Executive Secretary

. . . A motion to accept the report was seconded and carried.

### Report of the Maternal Welfare Committee

The Committee on Maternal Welfare has completed its first year of active work. Its duties, according to the by-laws of the Medical Society of the State of North Carolina adopted at a meeting in 1946, were principally to promote high standards in obstetric care for the state of North Carolina.

The committee proposed that a "Maternal Welfare Section" should be established in the **North Carolina Medical Journal** to enable publication of brief practical articles on pertinent obstetric subjects each month. This has been done, and the committee has prepared short but complete articles dealing with the problems affecting the maternal death rate in the state. The subjects have included three articles on the toxemias of pregnancy and their management, the use of posterior pituitary extract, cesarean section, and the induction of labor.

In order to acquaint all of the physicians of the state with the work the committee intends to carry out during the year, a semi-personal letter was mailed to each physician listed in the roster of our Society. This explanatory letter was mailed to 2,100 physicians in August, 1946.

The maternal mortality survey, whereby the committee would investigate each maternal death that occurred within the state, was begun in September, 1946. The purpose of the study is to determine the number of deaths that are preventable and what preventable factors played a part in the deaths which occur. One hundred and fifty-two certificates of death have been received by the committee, and all of the facts associated with the majority of them have now been obtained. Four full meetings of the committee have been held since August, 1946, for careful study of the records of maternal deaths. The completed records have been discussed by the entire committee in arriving at a conclusion about the preventability of the deaths, and a decision has been reached about the final analysis of the case. A complete summary of the committee's opinion and the reasons therefor have been mailed to the physicians who signed a death certificate as soon as feasible after the summary has been completed.

In addition to the four meetings held by the committee an active correspondence has led to a cooperative and effective spirit in completing the work to be done. Each member of the committee has cooperated in obtaining information about deaths which occur in his vicinity when it was necessary.

The committee has prepared a brief summary of the problems which exist in the management of obstetric complications in North Carolina for presentation to the Second General Session. Eighty-two records have been analyzed completely enough to permit final classification of the preventability of the deaths; 86.8 per cent of these deaths were avoidable. Ignorance or neglect on the part of the patient or her family was the principal preventable factor. Errors in judgment or technique of the management of the problem and lack of adequate facilities for the care of the patient have been serious problems.

The Maternal Welfare Committee will be prepared to draw wide conclusions in another year, and for the present recognizes the need for a widespread educational campaign among the laity. Numerous unnecessary deaths resulted from failure of the patient to seek medical aid.

The use of standard, safe practices in the management of obstetric complications must be widely encouraged by all members of our profession, and available consultants are urgently needed in many areas. Blood banks or other measures to facilitate the administration of whole blood in obstetric emergencies are essential to safe obstetric practice and must somehow be made available.

Financial Statement:

| | |
|---|---|
| **Receipts of the Committee** | |
| Anonymous donor | $2,543.75 |
| Medical Society of the State of North Carolina | 376.20 |
| Total | $2,919.95 |
| **Expenditures of the Committee** | |
| Salary | $ 740.72 |
| Printing, postage, and incidentals | 427.46 |
| Total | $1,168.18 |
| **Balance** | $1,751.77 |

The work of the committee in carrying out the maternal mortality survey requires the services of a full-time stenographer, and an enormous amount of postage and printing. The offices occupied by the committee have been supplied by the Bowman Gray School of Medicine of Wake Forest College. The services of the secretary are adequately provided for by the anonymous gift which made the work of the committee possible. The committee will require financial support from the State Medical Society for printing, postage, and incidental expenses if its work is to continue. Approximately $600 will be required for these expenses.

The committee wishes to express its appreciation to President Coppridge, to Secretary McMillan, to members of the Executive Committee, and to each individual in the State Society for the fine cooperation we have received.

Respectfully submitted,
J. Street Brewer, M.D.
G. M. Cooper, M.D.
Ernest W. Franklin, Jr., M.D.
Jasper S. Hunt, M.D.
Thomas Leslie Lee, M.D.
Ivan Procter, M.D.
R. A. Ross, M.D.
R. A. White, M.D.
Frank R. Lock, M.D., Chairman

. . . A motion to adopt the report was seconded and carried.

### Report of the Committee on Rural Health and Education

This is an era of rapidly changing social, economic and scientific conditions. As a result of these changes, organized medicine finds itself confronting an ever-expanding field for usefulness. We as physicians, individually and collectively, feel more keenly than ever before our responsibility in safeguarding the health and happiness of our people. Organized medicine is determined that to the underprivileged classes and rural areas of our country shall come better means of protecting life and promoting good health. The North Carolina Medical Society has definitely committed itself to the proposition that there shall be better and more even distribution of medical, nursing, and hospital services in our rural areas. Never before has it been the privilege of the medical fraternity to have adequate help from governmental agencies in developing such a great program. It is gratifying to think that under the leadership of organized medicine the foundation has been laid and the machinary set up for a great program to the rural population in particular. It is a real humanitarian movement backed by a public-spirited populace and a generous state and federal government.

Twenty million Americans live in our small towns, communities and open country. A high percentage of these people are in desperate need of more and better hospital and medical services. Incidents without end could be cited to prove this, but time will not permit. Certain it is that the medical profession is aware of their predicament and is intensely interested in bringing these services to them.

Let us get down to the state level and consider the situation in our own state of North Carolina, which is largely rural and typical of the country as a whole. Here we find glaring incidents of the uneven distribution of medical and hospital facilities. In many of our rural areas one doctor serves a population of three to four thousand, whereas the national average is one doctor to fifteen hundred people. The same imbalance is shown in the number of hospital beds per thousand population. This applies, of course, chiefly to the rural areas. In the thickly populated sections, cities and towns of our state and nation, the reverse is true. This shortage of medical and hospital care in the rural areas of our state is reflected in the high rate of rejections of our boys at the induction centers during the recent war, in our high maternal and infant death rates, and in the high incidence of physically defective people in our state.

What does organized medicine in North Carolina propose to do to remedy this situation? The foundation has been laid for the extension of hospital and medical services in our state by the Poe Commission and by the work of the Medical Care Commission in accordance with provisions of HB 594 passed by the General Assembly of 1945. I am proud to say that the North Carolina Medical Society led in this movement and has supported it all the way along. You are all more or less familiar with the work of the Medical Care Commission, which has made surveys of the medical and hospital situation in North Carolina; with the recommendations of the Commission to the 1947 General Assembly; and with the law passed recently by that body for the correction of the maldistribution of medical and hospital services. You know also of the appropriations made by the General Assembly to finance hospital and medical centers, medical education, nursing education, and public health centers throughout the state. All of this, of course, is contingent on federal and community funds to help in financing the projects. You have knowledge also of the great work of the Good Health Association of North Carolina in stimulating support among the civilian population for this important movement.

Your Committee on Rural Health and Education has had the matter of a definite program for rural groups under consideration for several months. Much information has been gathered and help received from Dr. H. B. Mulholland of the University of Virginia, regional chairman of the National Committee on Rural Health. However, no great progress has been made on account of lack of time and on account of other programs which, when finished, were to be used as a basis for our future program. Chief among these were the surveys, statistics, and recommendations of the Medical Care Commission already mentioned. We were anxious also to wait for action by the General Assembly on these recommendations.

It is the understanding of your committee that the Good Health Association is to be continued as a permanent organization. Furthermore, we are informed that a program is being arranged by that organization which will bring all interested state organizations into a coordinated program which will be brought to rural groups at stated times and places over the state. The programs will include consideration, among other things, of social, economic and health problems. It is your committee's feeling that the State Medical Society should cooperate in this program through its Rural Health Committee and arrange for local or outside physicians to appear before the rural groups to discuss the work of the Medical Care Commission, consider their needs for extended medical and hospital service, and give direction and advice in working out projects for their communities and counties on a local level. Cooperating in this way with farm groups will stimulate good public relations and sympathetic friendship and understanding. These discussions should also include serious consideration of the following points:

1. **Medical service in rural communities.** The question of how best to attract doctors to their individual communities and the advantages under which the doctor might expect to live and study and practice, the economic status of the people, the schools and churches, and the amount of income which a doctor could reasonably expect in a given community, all should be considered.

2. **Hospitals and health centers.** The real needs in this matter should be considered—the proximity of the community to hospitals and health centers, the number of beds which would probably be needed, and the ability to raise money to help build and maintain these projects. In a properly coordinated program, the staffing of these institutions with doctors and nurses and other help would need to be considered.

3. **Sanitation.** Ways and means to improve the sanitary conditions in our rural communities should be discussed—methods of educating the public and of working with schools of agriculture and chambers of commerce and other agencies to get laws passed affecting sanitary conditions in the communities.

4. **Prepaid insurance plans,** particularly Blue Cross non-profit plans such as the Hospital Saving Association. The advantages of low-cost Blue Cross insurance against the burdens of illness and hospitalization should be stressed with these rural groups. Every doctor, nurse, hospital, drug store and doctor's office should be a selling agency for Blue Cross insurance. The ultimate success of the extended hospital and medical program probably depends more upon prepaid insurance than upon any other single factor or group of factors. Organized medicine feels that it is probably the best protection against government control of medicine. The growth of Blue Cross plans has been phenomenal, and they deserve the earnest consideration and ardent support of the medical profession.

5. **The matter of recruitment of medical students, nursing students, and technicians** to the schools of the state giving these courses is another fundamental consideration in the general program. This matter should be carried directly to the rural groups. Recruitment appeals are now being prepared by the deans of the medical schools of the state. The advantages of medical, nursing, and technician careers should be stressed not only to the high school pupils, but to the children in the home, in the churches, and in the elementary schools of the state in connection with vocational guidance courses.

6. Other matters of importance for discussion with farm groups are **malnutrition, communicable diseases, venereal diseases, tuberculosis control, and cancer.** Also programs of **health education, rehabilitation, recreation facilities, maternal and infant health services,** and **periodic health examinations** should be brought to these people.

It is the feeling of the Committee on Rural Health that the farm groups and other rural groups of the state, once they are properly informed and in possession of the facts, will respond more and more to the expanded medical and hospital service program. Never before have they had such an opportunity. Never before has organized medicine been in a position to be of such great and altruistic service. It may be likened to "bread cast upon the waters," for from the rural communities will come boys and girls of stronger minds and bodies who will be in a position to run greater industries, churches, banks, professions, and cities for our country.

Finally, your committee wishes to make the following recommendations:

1. That the North Carolina Medical Society cooperate through its Committee on Rural Health and Education with the Good Health Association of North Carolina in bringing to rural groups representatives from the ranks of the medical profession to discuss with them their health and related problems.

2. That, in consideration of the fact that dissemination of information on public health and related matters is probably the most important service of organized medicine and one requiring broad knowledge, close contact with various agencies, and broad application, every member of the Medical Society of the State of North Carolina be urged to promote the program of extended medical and hospital services to the people of the state of North Carolina.

Respectfully submitted,
M. D. Hill, M.D.
W. R. Berryhill, M.D.
Fred C. Hubbard, M.D.,
Chairman

. . . A motion that the report be adopted was seconded and carried.

Dr. Roscoe McMillan, chairman of the **Committee on Arrangements,** explained the circumstances responsible for the Society's meeting outside the state. (See February and June issues of the **North Carolina Medical Journal,** pages 98 and 374.)

## NEW BUSINESS

### Resolution Regarding Closer Cooperation Between the Medical and Dental Professions

**Dr. J. Street Brewer** (Roseboro): I have been asked to present the following resolution:

"Since the medical and dental professions have a common interest in the extension of health services, it would be mutually advantageous to achieve a closer degree of cooperation than has existed in the past.

"THEREFORE BE IT RESOLVED that the president of the Medical Society of the State of North Carolina appoint a suitable committee to meet with one from the North Carolina Dental Society to discuss and recommend to their respective societies measures which will accomplish this end."

I move the adoption of this resolution.

. . . The motion was seconded and carried.

### Transferance of the Warren County Medical Society from the Sixth District to the Fourth District

**Dr. G. H. Macon** (Warrenton): I move that the By-Laws, Chapter VII, Section 1, be amended by transferring Warren County from the Sixth Councilor District to the Fourth Councilor District.

. . . The motion was seconded and carried.

### Admission of Medical Officers Stationed in North Carolina to State and County Medical Societies without Licensure

**Dr. S. S. Atkins** (Asheville): A problem has recently come to our attention in Buncombe County regarding the men in the Veterans Administration Hospital. These men, who have recently returned from the service, wish to become members of the State Society and of the local county society. In order to be eligible for membership in their special national organizations and for certification by the specialty boards, they have to be members of their local county and state societies. Many of them do not have their North Carolina license and do not want to apply for a license because they do not wish to practice in the state. We therefore wish to move that an amendment be made in the By-Laws, Chapter XV, Section 5.

The present Section reads:

"Section 5. Each county society shall judge of the qualifications of its own members, but, as such societies are the portals to this Society and to the American Medical Association, every reputable and legally registered white physician who is practicing, or who will agree to practice, non-sectarian medicine shall be entitled to membership. Before a charter is issued to any county society, full and ample notice and opportunity shall be given to every such physician in the county to become a member."

We should like to have you amend the By-Laws by designating that section as Section 5, paragraph (a) and by adding a paragraph reading as follows:

"(b) Any physician who is a member of the United States Army, Navy, Public Health Service, or Veterans Administration shall be eligible to active membership in the society of the county in which he resides."

I move that the By-Laws be so amended.

. . . The motion was seconded.

**Dr. L. A. Crowell** (Lincolnton): A matter of as much importance as this I think ought to have thorough consideration and study. I do not think it ought to be acted upon at this time, and I move that the motion be tabled.

. . . The motion to table was seconded.

**Dr. Julian A. Moore** (Asheville): According to the State Board of Medical Examiners a man who is in the armed services or with the Veterans Administration does not have to be licensed by the state of North Carolina. These men may be in the state only two or three years and then be transferred. They like to have membership in the state and local societies but do not care about being licensed in the state. The American Medical Association is behind this and is trying to get these men into organized medicine.

. . . A voice vote was taken, which was indecisive. The president then called for a show of hands, and the motion to table was carried.

### Expansion of Hospital Insurance Program

**Dr. V. K. Hart** (Charlotte): I wish to introduce this resolution:

"WHEREAS there has been a constant increase in hospital costs, with a constantly widening discrepancy between the amount of insurance paid and the amount of the bill; and

"WHEREAS the Blue Cross hospital insurance plan has found wide and favorable acceptance among the people of North Carolina; and

"WHEREAS this plan was originally sponsored through the Hospital Saving Association by the Medical Society of the State of North Carolina; and

"WHEREAS there has been an increase in the sale of surgical coverage as well as hospital coverage by the Blue Cross or other plans; and

"WHEREAS there has been and still is a wide discrepancy between the fees paid in surgical coverage and those charged by physicians; and

"WHEREAS there has been and is national propaganda for compulsory health insurance;

"BE IT RESOLVED by the House of Delegates of the Medical Society of the State of North Carolina that it indorse and advocate the following measures for immediate consideration by the members of the State Society:

"1. That a representative committee, including all surgical and medical specialties and representing the different sections of the state, be appointed by the president to review in the immediate future the whole question of hospital, medical, and surgical insurance. The executive officer of the Hospital Saving Association or of the merged corporation shall be an **ex officio** member of this committee.

2. That this committee make specific recommendations as to any practical expansions of hospital insurance.

"3. That, in particular, this committee outline a fee schedule for all surgical procedures for people of incomes up to and including $2,000 for the individual and $3,000 for the family.

"4. That this committee likewise recommend a similar fee schedule to cover all major medical illnesses requiring hospitalization.

"5. That this committee be empowered to change or modify the income group, or conditions pertaining thereto, as it sees fit.

"6. That the Hospital Saving Association or the merged corporation be asked to cooperate in underwriting any changes in hospital coverage recommended by the committee and that it also be asked to incorporate in new policies for total coverage such medical, surgical, and obstetric coverage as may be advised.

"7. That the House of Delegates recommend that the members of the State Society voluntarily enter into an agreement with the Hospital Saving Association or the merged corporation to abide by the fee schedules as agreed upon by the committee and to accept the fees named therein as payment in full for the above-specified income group.

"8. That the final report of the committee be submitted to the Executive Committee of the Medical Society of the State of North Carolina for approval or disapproval, and that approval shall constitute authority to proceed with the inauguration of the plan adopted."

I move the adoption of this resolution.

. . . The motion was seconded and carried unanimously.

### Change in Time of Installation of County Society Officers

**Dr. H. A. McAllister** (Lumberton): In the past it has been the custom for the county medical society officers to take office in January. In January, February, March, and April these new officers know practically nothing of what has gone on the year before in the meeting of the House of Delegates, and really know very little about how to cooperate with the state officers and the district officers. The Robeson County Medical Society voted unanimously to ask that the By-Laws be amended in some way so that the county medical society officers will take office probably in April. We believe that they can cooperate better with their district and state officers after having attended the State Society meeting in May.

I move that the By-Laws be so amended.

. . . The motion was seconded and carried.

The House of Delegates then adjourned, at 11:37 p.m.

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## WEDNESDAY AFTERNOON SESSION

### May 14, 1947

The House of Delegates convened in the ballroom of the Cavalier Hotel and was called to order by President Coppridge at 2:45 p.m. President Coppridge stated that a quorum was not present. It was moved that the House transact any business to come up and report to the Executive Committee, for approval or disapproval, any action taken. The motion was seconded and carried.

### Report of the Nominating Committee

President-Elect—Dr. J. F. Robertson, Wilmington
First Vice President—Dr. V. K. Hart, Charlotte
Second Vice President—Dr. J. G. Raby, Tarboro

Members State Board of Health for Four Years—Dr. G. G. Dixon, Ayden; Dr. J. LaBruce Ward, Asheville

Member Hospital Saving Association for Three Years—Dr. L. R. Hedgpeth, Lumberton

Delegates to Medical Society of Virginia (1947)—Dr. P. Y. Joyner, Enfield; Dr. Alban Papineau, Plymouth: Dr. Harry Johnson, Elkin

Delegates to South Carolina Medical Association (1948)—Dr. Frank P. Ward, Lumberton; Dr. Lewis Gaston, Albemarle; Dr. C. H. Pugh, Gastonia

Delegates to Medical Association of Georgia (1948)—Dr. Robert Mathews, Greensboro; Dr. W. H. Hoover, Murphy; Dr. Ben Kendall, Shelby

Delegates to Tennessee State Medical Association (1948)—Dr. B. O. Edwards, Asheville; Dr. G. Westbrook Murphy, Asheville; Dr. S. A. Whitehead, Asheville

Time and Place of meeting for 1948 to be determined by Dr. Frank A. Sharpe, president, Greensboro; Dr. Roscoe D. McMillan, secretary, Red Springs; and the Executive Committee

M. D. Hill, M.D., Chairman

. . . Upon motion, duly seconded and carried, the report was adopted.

### Report of the Committee on the President's Message

The message of our president reflects the thought and energy he has put into executing the duties of this high office.

His untiring efforts on behalf of this Medical Society in the past and previous years deserve the praise and appreciation of our organization.

Your committee believes that the recommendations presented in his reports are sound and to the best interests of the Society. We therefore suggest to the House of Delegates that all his recommendations be accepted and that the executive committee be instructed to implement these as soon as practicable.

. . . A motion that the report be accepted was seconded and carried.

## UNFINISHED BUSINESS

**Secretary McMillan:** There are one or two items that were carried over from the meeting on Monday, in regard to changing By-Laws. They had to lie over twenty-four hours. First, it was requested by the Warren County Medical Society that Warren County be transferred from the Sixth District to the Fourth District, for convenience. The consent of the councilor of the Fourth District has been secured, and all that is necessary is that this meeting approve the action taken by the House of Delegates at its meeting on Monday in allowing the change.

. . . Dr. R. B. Davis (Greensboro), substituting for Dr. H. R. Parker, moved that the change be approved. The motion was seconded and carried.

**Secretary McMillan:** The second order of business is a motion offered by Dr. Hugh McAllister to change the By-Laws so as to permit the officers of the county medical societies to assume their duties in April or May, or as soon as practicable after the meeting of the State Medical Society, instead of assuming office on January first, as has been the custom in the past. They are to be elected at the December meeting but will have five months, before taking office, in which to perfect their plans and come to the State Society meeting and learn what they can in order to carry out their duties.

. . . Dr. B. O. Edwards (Asheville) moved that it be optional with each county society as to whether its officers assume office on the first of January or in April or May, after the State Society meeting. This motion was seconded and carried.

. . . Dr. Hart's resolution with reference to hospital insurance (see p. 500) was then read. Upon motion by Dr. Harry L. Brockmann (High Point), seconded by Dr. Fred C. Hubbard (North Wilkesboro), it was adopted unanimously.

## NEW BUSINESS

**Dr. R. B. Davis** (Greensboro): The North Carolina Medical Society should be proud of its medical journal. I do not think there is any in the Union which is more scientifically and truthfully published. The journal cleared $2,000 last year. Besides being a wonderful asset to our Society, it has actually made money for the Society. I move that the salary of the editor of the **North Carolina Medical Journal**, Dr. Wingate M. Johnson, and that of the assistant editor, Miss Catherine Johnson, be increased at least $25 a month.

. . . The motion was seconded by Dr. Hill and carried unanimously.

**Dr. S. S. Atkins** (Asheville): At our meeting Monday night a motion was brought up before the House of Delegates which would permit the doctors practicing in the Veterans Administration hospitals to become members of the local medical society of the county in which they reside, without coming before the Board of Medical Examiners and securing license in North Carolina. That motion was tabled.

I move that a committee be appointed by the president to study this matter, to confer with the State Board of Medical Examiners, with the American Medical Association, with the specialty boards, and with any other groups they see fit, and to report back to the House of Delegates next year.

. . . The motion was seconded by Dr. Hubbard and carried unanimously.

There being no further business, the House of Delegates adjourned **sine die** at 3:30 p.m.

## REPORTS FILED BUT NOT READ

The following reports were filed with the secretary after the meeting of the House of Delegates:

### Report of the Insurance Committee

The Insurance Committee met to review previous work and to determine what policies should be followed in the future. The consensus of opinion was that the function of this Committee should be limited to investigation of insurance companies to see if their policies are sound, and should not recommend or endorse any particular company writing life, or health and accident insurance.

It seems necessary, however, to clear up some misunderstanding that has arisen in regard to policies of the World Insurance Company. There have been complaints from doctors that this company has not been issuing the type of policy agreed upon to the group. The Insurance Committee therefore conducted a thorough investigation of this company, soliciting the legal advice of the attorney for the State Medical Society and that of the Insurance Commissioner. We have also had what is, I believe, an unbiased study by a competent insurance man who does not handle health and accident insurance.

In brief, we find the World Insurance Company safe and sound. I believe much of the confusion has arisen because this company offers several policies from which the physician may choose, depending on his age and whether or not he wants to pay more premium for protection from the first day, and so forth.

This Committee will never advise a physician which policy he should buy. The physician contemplating taking out a policy can compare the policies himself. We would like to advise physicians who hold health and accident policies with more than one company to inform each company of the insurance carried. Failure to do so might jeopardize a portion of benefits with some companies. Policies state this but it may be overlooked.

No insurance company can do business long in the state without being approved by the Insurance Commission as being sound. A busy physician who needs insurance certainly doesn't want to give valuable time to every agent whose company is approved by the Commissioners. I am sure this Committee can assume some of the responsibility of investigating the type of policy the physician would want. He must not forget that in any group policy where a larger number insured means greater benefits (and if the number be large enough, no physical examination is required) it is to the advantage of the Society as a whole for each physician to be covered.

The Insurance Committee has been favorably impressed with the Analagraph method of mapping life insurance proceeds. A well-ordered plan of life insurance distribution to dependents or as a retirement income is charted scientifically and should appeal to physicians. If one's own insurance agent cannot give this service, the Committee will be glad to furnish the names of agents experienced in making analagraphs to apply to each one's specific requirements.

Alban Papineau, Chairman

### Report of the Committee on Revision of the Nurses' Practice Act

As chairman of the Committee to represent the State Medical Society in conference with the North Carolina Hospital Association and the North Carolina State Nurses Association regarding the revision of the Nurses' Practice Act of North Carolina, I wish to submit the following report:

Our Committee met once in Raleigh and then several weeks later with the graduate nurses in Durham, at which time an agreement was reached with them that they would not introduce any legislation altering the examining board or removing the physicians on this board. The legislation they secured in the legislature is as follows:

1. Annual re-registration of all professional registered nurses at a fee of $1.00 was required.
2. The reciprocity fee was reduced from $25.00 to $15.00
3. The fee for the written examination was increased from $10.00 to $15.00 and the sentence relative to refunding one-half the fee to those who fail the examination was deleted.
4. The section pertaining to the revocation of licenses was strengthened as it applies to the majority of other licensing boards in the state.

The past Legislature also passed a bill for practical nurses entitled "an act to promote the Education and Training of Practical Nurses and permit the use of the designation 'Licensed Practical Nurse' and to provide for the issuance of licenses to qualified practical nurses." A summary of the provisions of this bill follows:

1. That the present Board of Nurses Examiners (three registered nurses and two hospital representatives), together with three licensed practical nurses to be selected by the licensed practical nurses themselves, shall provide a twelve months' training course for practical nurses who desire to qualify themselves for performing nursing services which require more knowledge of the care of the sick than ordinary practical nursing experience now provides.

2. That the existing practical nurses with two years' experience and persons who shall take such training and are certified by the Board after examination be designated as "Licensed Practical Nurses."

3. That the act, however, shall not in any way be construed as prohibiting any other person from performing any type of nursing service.

The greater portion of the bill sets forth the machinery for accomplishing the above purposes.

Respectfully submitted,
M. D. Hill, M.D., Raleigh, Chairman
Moir S. Martin, M.D., Mt. Airy
Oren Moore, M.D., Charlotte
Ben F. Royal, M.D., Morehead City
C. T. Smith, M.D., Rocky Mount

### Report of the Committee on Home Care of Veterans

This committee has had several meetings since it was appointed last winter. We have also held many conferences with doctors, veterans and Veterans Administration representatives in an attempt to try to find the basic difficulties which were being encountered in the handling of the Veterans Administration's program in North Carolina.

One of our definite purposes was an attempt to eliminate as much red tape as was humanly possible and at the same time meet the government requirements. We are happy to say that we have now the Veterans Administration's approval for a set of blanks or requisitions for treatment, etc., which is approximately half the length of the original ones and, we feel, represents some improvement in this particular item.

During the course of our work, we have been considerably handicapped by the fact that most of the administrative heads of the regional offices in North Carolina are men with years of experience and training in the old type of veteran administration, whose aims have never been the care of the veteran in his own community by his own physician and by local medical and hospital facilities. Consequently, as a result of this background, we have found a reluctancy on the part of these administrative officers to accept the principle of local medical care. Therefore we were for all practical purposes defeated in our objective before we actually started. In several instances we have found that in local offices where there were young men who were not prejudiced in their point of view the intent and cooperation was much better than in the central offices. Also we can safely say that there have been confusion and duplication and a mass of red tape extending from Washington down through the regional and local offices. For example, our investigations have revealed that there are duplications of contracts, where hospitals hold contracts with the Veterans Administration and the present contract with the Veterans Admistration and the Hospital Saving Association, which is acting solely as an administrative agent between the doctors and the Veterans Administration. As a result in some instances a different fee may be paid for identical examinations, depending on whether the examination was done in an office or in a contract hospital.

Our committee has worked in very close connection with the Hospital Saving Association, through which all home care is supposed to clear, and we have found them most diligent in their efforts to perfect the machinery for a smooth and efficient working arrangement. This organization, however, has had its efforts in large measure thwarted from the beginning by the same sources of obstruction which we have referred to above. They are experiencing many-fold the same difficulties that we as doctors are experiencing individually in trying to get a clear, concise and smooth-working agreement.

We would like to re-emphasize and state again our belief in the sound basic principle of veterans' being cared for by local physicians and local medical facilities rather than in regimented veterans' hospitals. We realize that in certain disease—for example, tuberculosis and mental diseases—where long and protracted hospitalization is required, that local facilities are not ample and this type of care can better be handled by other methods. We believe, however, that by the method of local home care in the vast majority of instances the veteran will get better, happier, more convenient and more economic and time-saving medical care and at the same time the doctor-patient relationship will be maintained on a basis of free choice and fee-for-service remuneration.

**Recommendations:**

(1) That an enlarged committee be continued to study further this extremely important problem, because unless the present trends are broken government medical care for approximately 60 per cent of the population ultimately is inevitable. We feel that this committee should represent, and that it requires, the best medical minds and leadership available.

(2) That every individual physician support this program and exert every effort personally to make it function efficiently and effectively. We believe that this necessitates the unanimous support of the Medical Society.

(3) That the Society exert all its influence and prestige to insure that medical care of veterans, exclusive of those conditions requiring long periods of hospital or domiciliary care, be provided by local medical talent and hospital facilities.

Everett Bugg, M.D.
Alexander Webb, M.D.
E. McG. Hedgpeth, M.D.,
Chairman

### Report of the Committee on Tuberculosis

There are 1,085 beds in North Carolina state tuberculosis sanatoria: 600 at Sanatorium, 185 in the Eastern Sanatorium at Wilson, and 300 in the Western Sanatorium at Black Mountain. In addition there are 733 beds in county sanatoria and 1,226 in the federal sanatorium at Oteen. The sanatorium at Oteen serves many states.

Instead of 1,085 beds it is estimated that we need a minimum of 3,000 beds in state sanatoria. The 1947 legislature decided to complete the Eastern Sanatorium, adding some 200 beds, and we understand that funds were provided for 40 additional beds at the Western Sanatorium. Furnishing only 240 additional beds when there is an urgent need for 1,000 beds is like throwing a few life preservers to a drowning multitude.

In our opinion, the state should no longer look to county sanatoria to take up the slack. The average county sanatorium is a sanatorium only in name. There are a few exceptions, where the sanatorium is large enough to justify the overhead cost of running a good sanatorium. The modern treatment of tuberculosis, including the various types of surgery, can be done efficiently and economically only in large institutions. The average county and the average city are not able to finance such an institution, while the state is well able to do so.

In our opinion the next legislature should be asked to provide a sanatorium in the Albemarle area for white patients and one in the Piedmont area for Negroes. Here is a challenge to the whole medical profession.

The State Board of Health has, with its mobile x-ray units, conducted mass x-ray clinics in several counties, but unless their facilities are largely increased it will be many years before they can reach all counties.

In the meantime we would like to see the State Sanatorium, under Dr. Willis, restore to local health departments the extension clinic units which at one time were a potent factor in case finding throughout the commonwealth.

In closing, we would like to call your attention to the fine piece of educational work done by the North Carolina Tuberculosis Association under the leadership of Frank W. Webster. As an important agency in the control and eradication of tuberculosis the Association is aware of its responsibility and, in our opinion, is meeting this responsibility in a magnificent way.

Respectfully submitted,
H. L. Seay, M.D.
L. B. Skeen, M.D.
N. Thomas Ennett, M.D.,
Chairman

# GENERAL SESSIONS

## FIRST GENERAL SESSION

### Tuesday, May 13, 1947

The first general session of the ninety-third annual meeting of the Medical Society of the State of North Carolina convened in the Panorama Room of the Cavalier Hotel's Beach Club and was called to order by the secretary-treasurer, Dr. Roscoe McMillan, who gave the invocation. Secretary McMillan then introduced the president, Dr. William M. Coppridge, who took the chair and called for the report of the Obituary Committee.

### Report of the Obituary Committee

When Earth's last picture is painted
And the tubes are twisted and dried,
When the oldest colors have faded,
And the youngest critic has died,
We shall rest, and faith, we shall need it,
Lie down for an aeon or two,
'Til the Master of All Good Workmen,
Shall put us to work anew.
—Kipling

Another year has passed and we meet again to pay tribute to our comrades who walk no more with us, to our comrades who have rested from their labors. Whether their years were many or few they served their day and generation well. Their ministry of healing challenged them night and day, making them ever forgetful of self in their service to others. Let us not grieve because they are gone, but rather let us rejoice that they were willing to give their last full measure of devotion to so noble a task. As we pause to pay this last tribute to their lives of unselfish service may we take from them the torch and lift it high. Sorrows and reverses which so often interrupt the joy of living need not make us lose courage. Strength is given to brave the storm as well as to sail the ship of life on the calm waters of a tranquil sea. With an unfaltering trust in God's wisdom, we can have the courage to keep on, to think and plan, to persevere and fulfill.

Beyond the Horizon

When men go down to the sea in ships,
'Tis not to the sea they go;
Some isle or pole, the mariner's goal,
And thither they sail through calm and gale,
When down to the sea they go.

When souls go down to the sea by ships,
And the dark ship's name is Death,
Why mourn and wail at the vanishing sail?
Though outward bound, God's world is round,
And only a ship is Death.

When I go down to the sea by ship
And Death unfurls her sail,
Weep not for me, for there will be
A living host on another coast
To beckon and cry, "All Hail!"
—Robert Freeman

May we stand now for the reading of the names of those who have died since last we met. At the close of the reading continue standing for a moment of silent prayer.

Dr. R. M. Abernathy
Dr. M. L. Barefoot
Dr. G. H. Beecher
Dr. N. M. Blalock
Dr. M. P. Blair
Dr. E. H. Bowling (Honorary Fellow)
Dr. H. M. Brinkley
Dr. E. W. Brown
Dr. A. B. Byerly (Honorary Fellow)
Dr. M. L. Carr
Dr. T. L. Carter
Dr. W. H. Cobb (Honorary Fellow)
Dr. G. S. Coleman (Honorary Fellow)
Dr. R. H. Cox
Dr. J. F. Cranford
Dr. E. B. Craven, Jr.
Dr. C. P. Crudup
Dr. D. B. Darden
Dr. John Donnelly (Honorary Fellow)
Dr. W. F. Elliott
Dr. J. E. Evans
Dr. W. C. Fisher
Dr. J. B. Gibbs
Dr. C. F. Gold (Honorary Fellow)
Dr. W. T. Griggs (Honorary Fellow)
Dr. B. K. Hays (Honorary Fellow)
Dr. S. C. Heighway (Honorary Fellow)
Dr. H. E. Henry
Dr. B. A. Hocutt (Honorary Fellow)
Dr. A. W. James
Dr. W. D. James (Honorary Fellow)
Dr. W. R. Jenkins
Dr. Peter John (Honorary Fellow)
Dr. C. F. Jones
Dr. E. C. Judd (Honorary Fellow)
Dr. J. M. Judd (Honorary Fellow)
Dr. H. F. Kinsman (Honorary Fellow)
Dr. B. B. Lloyd
Dr. P. P. McCain (Honorary Fellow)
Dr. C. H. McCants
Dr. R. S. McGeachy (Honorary Fellow)
Dr. J. F. McKay (Honorary Fellow)
Dr. J. M. McMillan (Honorary Fellow)
Dr. W. C. Morrow (Honorary Fellow)
Dr. R. E. Nichols (Honorary Fellow)
Dr. J. R. Paddison (Honorary Fellow)
Dr. L. N. Patrick
Dr. H. G. Perry (Honorary Fellow)
Dr. E. C. Person (Honorary Fellow)
Dr. J. A. Pickett (Honorary Fellow)
Dr. T. N. Reid (Honorary Fellow)
Dr. J. B. Riddle (Honorary Fellow)
Dr. W. A. Rogers (Honorary Fellow)
Dr. R. B. Scales
Dr. H. C. Shirley
Dr. I. I. Shure
Dr. F. G. Sigman (Honorary Fellow)
Dr. W. C. Slate (Honorary Fellow)
Dr. D. A. Stanton (Honorary Fellow)
Dr. Raymond Thornhill
Dr. Robert L. Waddill
Dr. J. L. Weddington
Dr. Frank Wilson, Jr.
Dr. A. R. Winston
Dr. J. L. Wyatt

Arthur A. James, Jr., M.D.
Chairman

**Secretary McMillan:** To depart from the usual custom of our Obituary Committee, I wish to pay special respect to one of the most beloved physicians in North Carolina, a man who really died in the service of the Medical Society of the State of North Carolina while **en route** to attend a meeting of a special committee of the Society. I refer to Paul P. McCain.

### Paul P. McCain, M.D.

The tragic death of Paul P. McCain, M.D. on November 25, 1946, deprived the profession of one of its most proficient and honorable members, inflicted a loss upon humanity, and emphasized the uncertainty of human existence.

Born at Due West, South Carolina, on June 26, 1884, he chose Erskine College, in his native state, for his undergraduate studies, and was graduated from there in 1906. Having chosen medicine as his profession, he attended the University of Maryland, receiving his M.D. degree there in 1911.

In March, 1914, he became assistant superintendent and chief of medical service at the North Carolina State Sanatorium for the treatment of tuberculosis. Upon the resignation of Dr. L. B. McBrayer, he became superintendent and medical director of that institution, and director of its extension service. When the Western Sanatorium was opened at Black Mountain in 1927, he also became head of that institution.

In 1936, the University of North Carolina conferred upon him the honorary degree of LL.D. When the Eastern North Carolina Sanatorium was opened at Wilson in 1942, he became head of that institution also.

Dr. McCain married Miss Sadie Lou McBrayer, daughter of Dr. McBrayer, on October 17, 1917, and of that union three daughters and two sons were born.

He was engaged in the performance of his duty when tragedy claimed him for its own, being **en route** to Raleigh to attend a meeting of the Medical Care Commission.

While many volumes might be written in tribute to this humble, yet powerful servant of humanity and of its God, these would be insufficient to appraise his real worth, which was exemplified in action, rather than in words. His life was a challenge to the pioneer, an example for the daily worker in life's routine. It was dedicated to service in the purest sense of that term.

The cornerstone of this man's success was integrity—and upon and around it he built a structure of noblest architecture, as a memorial to stand in the stead of any extravagant eulogy written to his memory.

And so, humanity has lost a friend and the medical profession a member whose private life and professional career will cause generations yet unborn to rise up and call him blessed. We can express for him no greater mark of esteem than to breathe the humble prayer: "God, do it again!"

Respectfully submitted,
Roscoe D. McMillan, M.D.

### Report of the Moore County Award Committee

The paper by Dr. E. C. Hamblen, Durham, entitled "Some Aspects of Sex Endocrinology," read in the Section on the General Practice of Medicine and Surgery, has been selected to receive the award for 1946.

The committee would like to suggest that rules be clarified for the guidance of section chairmen and committees appointed by them. It was the intent of the Moore County Society in setting up the award that it be given for the best paper presented by a general practitioner or specialist, but preferably one describing original work.

Since the Constitution and By-Laws of the Society state that all papers read before the Society become the property of the **North Carolina Medical Journal**, papers which are not submitted to the **Journal** for publication should be ineligible for consideration by the Moore County Award Committee.

W. T. Rainey, M.D., Chairman
W. R. Stanford, M.D.
G. T. Harrell, M.D.

President Coppridge presented Dr. George Harrell of Winston-Salem, who spoke on "The Integration of the Preventive Medical Aspects of Private Practice with a Public Health Program."

Dr. Eugene A. Stead of Durham was introduced and spoke on "Recent Advances in Our Knowledge of Congestive Heart Failure."

Vice-President Bell presented Dr. E. S. King of Winston-Salem, who gave a paper entitled "Routine Blood Cultures in Pediatrics."

Talks by two guest speakers, Dr. Robert McIver of Jacksonville, Florida, and Dr. R. Franklin Carter of New York City, followed. Dr. McIver's subject was "The Diagnosis and Surgical Management of Abdominal Pain in Non-Calculous Obstruction of the Upper Urinary Tract." Dr. Carter spoke on "Tumors of the Neck Encountered in General Surgical Practice."

Dr. Leslie Lee of Kinston, chairman of the Society's Cancer Committee, presented Dr. A. W. Oughterson, the Medical and Scientific Director of the American Cancer Society. Dr. Oughterson gave a paper entitled "Planning the Attack on Cancer."

Dr. Allan Tuggle of Charlotte read a paper by himself and Dr. T. A. Murrah, entitled "Pericolitis and Pericolonic Masses."

The first general session adjourned at 12:40 p.m.

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## BANQUET SESSION

### Tuesday, May 13, 1947

The annual banquet of the Medical Society was held in the dining room of the Cavalier Hotel, with the secretary-treasurer, Dr. Roscoe McMillan, acting as toastmaster. Following the invocation and presentation of guests, Secretary McMillan introduced Dr. William M. Coppridge, who delivered his presidential address (published in the June issue of the **North Carolina Medical Journal.**)

### Presentation of the President's Jewel

Secretary McMillan introduced the president-elect, Dr. Frank A. Sharpe of Greensboro.

**Dr. Sharpe:** At Christmas, on a momentous occasion, in the event of a great accomplishment, or even in the hour of sorrow we are always made happy by the opportunities afforded us to give to another. So tonight we are all happy and festive, for we are assembled here to celebrate and to pay honor to one of our own for a hard job well done.

Bill Coppridge has carried a full cup with a steady hand and a level head. Any one of us, I am sure, would swell with pride at the privilege of extending to him our blessing and thanks. From among his many, many close friends I have selected one of the closest to present to Dr. Coppridge the token of this Society's gratitude. I take pleasure in presenting Dr. Hamilton McKay.

**Dr. McKay:** I have been signally honored in being asked to award the president's jewel, and I am very deeply grateful to President-Elect Sharpe for this very gracious act.

The past year has not been an ordinary one in the history of medicine in North Carolina, and the recipient of this citation has furnished exceptionally fine leadership for the medical profession of North Carolina. By virtue of his progressive leadership, his capacity for work, and his devotion to the advancement of organized medicine in our state, he has been one of the large number of individuals who have focused the attention of medicine in the United States on North Carolina medicine. By the passage of the medical care and hospital bill into law he has said to the profession of the state that he believes it is not enough for a doctor or a specialist to take care of the sick and the injured alone, but that the modern doctor of today and tomorrow must devote and dedicate a large part of his time, first, to the development and organization of hospitals and medical centers; second, to the progress of organized medicine in its various societies; and third, to the promotion of medical education in its various phases in every section of North Carolina.

Dr. Coppridge, it gives me great pleasure, on behalf of the members of this Society, to present this jewel to you; and I hope you will receive it with as much joy and pleasure as it gives me, representing the members of this Medical Society, to present it to you.

. . . Dr. McKay presented the jewel to President Coppridge, and the banquet session then adjourned.

## SECOND GENERAL SESSION

### Wednesday, May 14, 1947

The second general session was called to order by the vice president, Dr. J. B. Bullitt, who introduced the first five speakers, Dr. Frank Lock of Winston-Salem, Dr. K. S. Grimson of Durham, Dr. Leslie B. Hohman of Durham, Dr. E. S. Orgain of Durham, and Dr. Edwin Wood, guest speaker, of Charlottesville, Virginia. Dr. Lock spoke on "Obstetrics in North Carolina." Dr. Grimson's subject was "The Present Status of Vagotomy in the Treatment of Peptic Ulcer." Dr. Hohman gave a paper entitled "The Emotional Toll of Combat Experiences." Dr. Orgain spoke on "Recent Advances in the Treatment of Heart Disease," and Dr. Wood on "Theoretical and Practical Significance of Renal Sodium Excretion in Congestive Heart Failure."

Dr. Harry S. Winkler, chairman of the Committee on Industrial Health, then introduced Dr. Raymond Hussey, dean of the Wayne University School of Occupational Health, Detroit. Dr. Hussey talked on "Human Relations Approach to Occupational Health."

Suggestions were made that telegrams be sent to Dr. Hubert Royster, Dr. James K. Hall, and Dr. G. M. Cooper, all of whom were unable to attend the meeting because of illness. The secretary was instructed to send these telegrams.

### Election of Two Members of the Editorial Board of the North Carolina Medical Journal

President Coppridge called for nominations for two members of the editorial board to take the place of Dr. Reece Berryhill and Dr. Josiah C. Trent, whose terms expired in 1947. Dr. H. A. McAllister of Lumberton moved that Dr. Berryhill and Dr. Trent be elected to succeed themselves. The motion was seconded and carried.

### Conjoint Meeting with State Board of Health

The second general session was then adjourned for the conjoint meeting of the Medical Society of the State of North Carolina and the North Carolina State Board of Health. Dr. S. D. Craig presided over this meeting, and Dr. Carl V. Reynolds, secretary of the State Board of Health, delivered his annual report.

## THIRD GENERAL SESSION

### Wednesday, May 14, 1947

The third general session was called to order by President Coppridge in the ballroom of the Cavalier Hotel at 5 p.m. Secretary McMillan read the report of the Nominating Committee, as adopted by the House of Delegates. Upon motion, duly made and seconded, this report was accepted.

The following resolution was read and adopted unanimously:

"BE IT RESOLVED that the Medical Society of the State of North Carolina, in its Ninety-Third Annual Session assembled, express its sincere gratitude and appreciation to the Virginia Beach Chamber of Commerce for its help in making the arrangements for this meeting; to the management of the hotels, especially that of the Cavalier, for the many courtesies extended to the members of this Society; to the Baptist, Episcopal, and Methodist Churches of Virginia Beach and the U.S.O. for furnishing meeting places for the sections; to the Reverend Coy Peterson and the Reverend Robert E. Forrest for their part in the meetings; and to the press for the publicity given; and

"BE IT FURTHER RESOLVED that this resolution be made a part of the official minutes of the Society."

### Installation of New Officers

**President Coppridge:** I should like at this time to present to you your new president. I have known Frank Sharpe a long time. We served for six years together on the Board of Medical Examiners and came to have a high regard for each other. I feel that the welfare of the Society is in good hands next year, and I take great pleasure in turning over the presidency to Dr. Frank Sharpe.

. . . Dr. Sharpe then made some inaugural remarks (published in the June issue of the **North Carolina Medical Journal**), and presented Dr. James F. Robertson, president-elect, and Drs. V. K. Hart and J. G. Raby, first and second vice presidents.

The ninety-third annual session of the Medical Society of the State of North Carolina then adjourned **sine die** at 5:40 p.m.

ADDITIONAL COPIES of the ALPHABETICAL LIST

and

ROSTER OF FELLOWS BY COUNTIES

are available from

DR. ROSCOE McMILLAN, Red Springs,

at 25c per copy.

# ALPHABETICAL LIST OF FELLOWS FOR 1947 WITH POSTOFFICE ADDRESSES

The number in small type following each name indicates the county society under which the Fellow is listed in the roster by counties.

A key to specialties is to be found at the end of the alphabetical list.

### Honorary Members

| | |
|---|---|
| *Paul V. Anderson, M.D., | Richmond, Va. |
| William Seaman Bainbridge, M.D. | New York |
| James K. Hall, M.D., | Richmond, Va. |
| Stuart McGuire, M.D., | Richmond, Va. |
| R. L. Payne, Jr., M.D. | Norfolk, Va. |
| Fred W. Rankin, M.D. | Lexington, Ky. |
| William Sharpe, M.D. | New York |

### Fellows and Honorary Fellows

| | | |
|---|---|---|
| *Abernethy, Paul McBee | 66 | Rutherfordton |
| Abernethy, Olivia, GP | 70 | Elkin |
| Adair, William Edward, GP | 33 | Erwin |
| Adams, Anne Stephenson, GP | 25 | Concord |
| Adams, Carlton Noble, ObG | 25 | Winston-Salem |
| Adams, Fletcher Ruff, PH | 10 | Concord |
| Adams, James Robert, Pd | 48 | Charlotte |
| Adams, R. K., P | 9 | Morganton |
| Ader, Otis Ladeau, PH | 25 | Walkertown |
| Adkins, T. F., ObG | 23 | Durham |
| Alexander, George Thomas, GP | 21 | Thomasville |
| Alexander, James Moses, I | 48 | Charlotte |
| Alexander, James Ramsey (Hon.) | 48 | Charlotte |
| Alexander, Sydenham B., I | 23 | Richmond, Va. |
| Allen, Charles Insley, S | 2 | Wadesboro |
| Allen, George Calvin, OALR | 63 | Lumberton |
| Allen, Joe W., OALR | 71 | Brevard |
| Allen, Joseph A. (Hon.), GP | 69 | New London |
| Allgood, John W., I | 31 | Greensboro |
| Allgood, Reese Alexander (Hon.), GP | 20 | Fayetteville |
| Alyea, Edwin Pascal, U | 23 | Durham |
| Ambler, Arthur Chase, Anes | 8 | Asheville |
| Anders, McTyeire Gallant (Hon.), Pd | 27 | Gastonia |
| †Anderson, Charles Alexander (Hon.), GP | 1 | Burlington |
| Anderson, Elbert Carl, Oph | 52 | Wilmington |
| Anderson, Irene, P | 52 | Wrightsville Beach |
| *Anderson, Katherine, Pd | 25 | Winston-Salem |
| Anderson, Norman LaRue | 8 | Black Mountain |
| *Anderson, Richard Speight, S | 24 | Whitakers |
| Anderson, William Banks, OALR | 23 | Durham |
| Andrew, John Montgomery, R | 21 | Lexington |
| Andrew, Lacey Allen, Jr., U | 25 | Winston-Salem |
| Andrews, Edward David | 48 | Charlotte |
| Andrews, Vernon L., GP | 50 | Mt. Gilead |
| Angel, Edgar, S | 44 | Franklin |
| Angel, Furman, S | 44 | Franklin |
| Anthony, James Edward (Hon.), GP | 17 | Kings Mountain |
| Anthony, William Augustus, GP | 27 | Gastonia |
| Antonakos, Theodore, S | 31 | Greensboro |
| Apple, Elbert Dwight, R | 31 | Greensboro |
| Arena, Jay Morris, Pd | 23 | Durham |
| Arenson, Nathan, R | 23 | Durham |
| Armentrout, Charles H., I | 8 | Asheville |
| *Armistead, Drury Branch, I | 59 | Greenville |
| Armstrong, Charles Wallace (Hon.), PH | 65 | Salisbury |
| Arney, William Charles, GP | 9 | Morganton |
| Arnold, Ralph Aranovitz, OALR | 23 | Durham |
| Arrendale, Joe J., GP | 44 | Cornelia, Ga. |
| Ashby, Edward Clayton (Hon.), S | 70 | Mt. Airy |
| Ashby, Julian Warrington, PN | 74 | Raleigh |
| *Ashe, John Rainey (Hon.), Pd | 48 | Charlotte |
| Ashford, Charles Hall, GP | 19 | New Bern |
| *Atkins, Stanley Sisco, Or | 8 | Asheville |
| Austin, DeWitt Ray, P&U | 48 | Charlotte |
| *Austin, Frederick Da Costa, Jr., S&U | 48 | Charlotte |
| Aycock, Edwin Burtis, GP | 59 | Greenville |
| Aycock, Francis Marion, GP | 40 | Princeton |
| Ayers, James Salisbury, GP | 67 | Clinton |
| Bacon, Harold Lyle | 39 | Bryson City |
| Bailey, Clarence Whitfield, OALR | 24 | Rocky Mount |
| Bailey, Harmon J., ObG | 8 | Asheville |
| Bailey, Hilda H., GP | 4 | Banner Elk |
| Bailey, M. H. | 56 | Elizabeth City |
| Bain, Eugene A., PH | 31 | Greensboro |
| *Baird, Harry Haynes, U | 48 | Charlotte |
| *Baker, Lenox Dial, Or | 23 | Durham |
| *Baker, Thomas Williams, I | 48 | Charlotte |
| Baldwin, William E., Jr. | 18 | Whiteville |
| Ballard, Claude H., GP | 42 | Kinston |
| Ballou, James Larkin, Oph | 3 | Grassy Creek |
| Bandy, William Gaither (Hon.), GP | 43 | Lincolnton |
| Bangle, James Alexander, GP | 10 | Concord |
| Banner, Charles Whitlock (Hon.), OALR | 31 | Greensboro |
| Barbee, George S. (Hon.), GP | 74 | Zebulon |
| Bardin, Robert Malcolm, GP | 78 | Wilson |
| *Barefoot, Graham Ballard, Path & R | 52 | Wilmington |
| Barefoot, Sherwood W. | 31 | Greensboro |
| Barefoot, William Frederick, S | 52 | Wilmington |
| Barham, Berlin Francis, GP | 61 | Asheboro |
| Barker, Christopher Sylvanus, GP | 19 | New Bern |
| Barkwell, John H., GP | 56 | Weeksville |
| Barnes, Henry Eugene, Jr., C | 13 | Hickory |
| Barnes, Jesse Thomas, S | 61 | Asheboro |
| Barnes, Margaret A., P | 48 | Charlotte |
| Barnes, Tiffany, GP | 61 | Asheboro |
| Barnhardt, Albert Earl, GP | 10 | Kannapolis |
| Barrett, John Milton, Ob | 59 | Greenville |
| Barrier, Henry Webster, PN | 10 | Concord |
| Barringer, Archie L., GP | 10 | Mt. Pleasant |
| Barringer, Phil L., GP | 13 | Hickory |
| *Barron, Archibald Alexander (Hon.), PN | 48 | Charlotte |
| *Basnight, Thomas Gray (Hon.), GP | 59 | Greenville |
| Bass, Beaty Lee, S | 66 | Rutherfordton |
| *Bass, Harris Hartwell, Ob | 73 | Henderson |
| *Bass, R. E., GP | 18 | Chadbourn |
| Bass, Spencer Pippin (Hon.), GP | 24 | Tarboro |
| *Battle, Margaret White, ObG | 24 | Rocky Mount |
| *Battle, Newsom Pittman, S | 24 | Rocky Mount |
| Baxter, Oscar Dixon, R | 48 | Charlotte |
| Baylin, George Jay, R | 23 | Durham |
| Beach, William R, GP | 64 | Madison |
| Beale, Seth McPherson, GP | 70 | Elkin |
| Beall, Louis Girardeau (Hon.), NP | 9 | Morganton |
| Beall, Lawrence Lincoln, S | 30 | Greensboro |
| Beam, Hugh Martin, GP | 58 | Roxboro |
| *Beasley, Edward Bruce (Hon.), GP | 59 | Fountain |
| Beaver, Charles L., S | 31 | Greensboro |
| Beavers, James Wallace, GP | 25 | Kernersville |
| Beavers, William Olive | 31 | Greensboro |
| *Beckwith, Robert Payne (Hon.), Pd | 32 | Roanoke Rapids |
| Belcher, Cecil Cullen, U | 8 | Asheville |
| Belk, George W. | 27 | Gastonia |
| Bell, Andrew E. (Hon.), GP | 38 | Mooresville |
| Bell, Felix Ortan, GP | 1 | Burlington |
| *Bell, George Erick, ObG | 78 | Wilson |

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* Present at 1947 meeting.

† Deceased.

Bell, L. Nelson, S [8] ........ Asheville
Bell, Orville Earl, GP [24] ........ Rocky Mount
Bell, Spencer Alexander, GP [70] ........ Hamptonville
Bellamy, Robert Hartlee (Hon.), GP [52] .. Wilmington
Bellows, Rowland Thompson, NS [48] ........ Charlotte
Belton, Joseph Franklin (Hon.),
GP [25] ........ Winston-Salem
Benbow, Edgar Vernon, S [25] ........ Winston-Salem
Bender, John Joseph, GP [63] ........ Red Springs
*Bender, John Robert, GP [25] ........ Winston-Salem
Bennett, Basil, P [8] ........ Asheville
Bennett, Ernest Claxton, GP [7] ........ Elizabethtown
Bennett, Joseph Hammond (Hon.),
GP [2] ........ Wadesboro
Bennett, J. W., GP [1] ........ Burlington
Bennett, William Lewis, GP [49] ........ Burnsville
Benson, Norman Oliver, U [63] ........ Lumberton
Bentley, James Gordon, GP [77] ........ Moravian Falls
Benton, George Ruffin, Jr. [76] ........ Fremont
Benton, George Ruffin, Sr. (Hon.), [76] ........ Fremont
*Benton, Wayne Jefferson, GP [31] ........ Greensboro
Berry, James W., GP [49] ........ Bakersville
*Berryhill, Walter Reece, I & Ed, [23] ........ Chapel Hill
Best, Deleon Edward, C [76] ........ Goldsboro
*Best, Glenn Eben, GP [67] ........ Clinton
Best, Henry Blount (Hon.), GP [78] ........ Wilson
*Bethel, Millard Baimbridge, PH [48] ........ Charlotte
Biggs, John Irvin, S [63] ........ Lumberton
Biggs, Montgomery Herman (Hon.),
S [66] ........ Rutherfordton
Bigham, Roy Stinson, Jr., I [48] ........ Charlotte
*Billings, Gilbert M., OALR [9] ........ Morganton
Bingham, Robert Knox, GP [3] ........ Boone
Bird, Ignacio [31] ........ Greensboro
Bitting, Numa Duncan (Hon.), S [23] ........ Durham
Bittinger, Charles Lewis [38] ........ Mooresville
*Bittinger, Samuel Moffett, T [8] ........ Oteen
Bizzell, James W., OALR [76] ........ Goldsboro
*Bizzell, Marcus Edward, OALR [76] ........ Goldsboro
Bizzell, Thomas Malcolm (Hon.), GP [76] .. Goldsboro
*Black, George William, NS [48] ........ Charlotte
Black, John Riley, Jr., GP [18] ........ Whiteville
Black, Oscar Reid, GP [65] ........ Landis
Black, Paul Adrian Lawrence [52] ........ Wilmington
Blackshear, Thomas Joseph, OALR [78] ........ Wilson
Blackwelder, R. G., NP [74] ........ Raleigh
Blackwelder, Verne Hamilton, S [11] ........ Lenoir
Blair, James Luther ObG [27] ........ Gastonia
Blair, J. Samuel, Ob [27] ........ Gastonia
Blanchard, Irvin T., GP [56] ........ Elizabeth City
Blanchard, Thomas W., GP [28] ........ Hobbsville
Bland, Charles Atlas, GP [26] ........ Louisburg
Bliss, Forrest Edgar, S [17] ........ Lawndale
Block, Milton Edward, GP [21] ........ Lexington
Blowe, Ralph Boyd, GP [32] ........ Weldon
*Blue, Waylon, GP [41] ........ Jonesboro
Boehm, Emil, P [9] ........ Morganton
Boice, Edmund Simpson (Hon.), S [24] .. Rocky Mount
Bolstad, Selma C., GP [45] ........ Hot Springs
Bolt, Conway Anderson, GP [72] ........ Marshville
Bolus, Michael, D [74] ........ Raleigh
Bond, George F., GP [35] ........ Chimney Rock
Boney, Elwood Rantz, I [42] ........ Kinston
*Bonner, John Bryan, GP [5] ........ Aurora
Bonner, John Bryan Havens, T [56] ........ Elizabeth City
*Bonner, Kemp Plummer Battle (Hon.),
Pd [12] ........ Morehead City
*Bonner, Merle Dumont, T [31] ........ Jamestown
*Bonner, Octavius Blanchard, OALR [31] .... High Point
Booker, Edward Nelson, GP [40] ........ Selma
Boone, William Henry (Hon.), GP [23] ........ Durham
Boone, William Waldo, GP [23] ........ Durham
*Bost, Thomas Creasy, S [48] ........ Charlotte
Bostic, William Chivous (Hon.), Ind [66] .. Forest City
Bostic, William Chivous, Jr. [66] ........ Forest City
Bowen, James Poore, S [51] ........ Aberdeen

Bowers, Marvin Arthur (Hon.),
GP [25] ........ Winston-Salem
Bowles, Francis Norman, ObG [23] ........ Durham
Bowman, Earle Ledbetter (Hon.),
GP [63] ........ Lumberton
*Bowman, Hugh Edgar (Hon.), GP [51] ........ Aberdeen
Boyce, O. D., ObG [27] ........ Gastonia
Boyles, Memory Ford, OALR [48] ........ Charlotte
Brabson, John Anderson, S [48] ........ Charlotte
Brackett, William Ernest, OALR [35] .. Hendersonville
Braddy, Wade Hampton (Hon.), GP [1] .... Burlington
Bradford, George Edwin, OALR [25] .... Winston-Salem
Bradford, Wallace Brown, ObG [48] ........ Charlotte
Bradford, Williamson Ziegler, ObG [48] ........ Charlotte
Bradshaw, Howard Holt, S [25] ........ Winston-Salem
*Bradshaw, Thomas Gavin, GP [78] ........ Wilson
Bradsher, James Sidney, I [29] ........ Stovall
Branaman, Guy Hewitt, ObG [74] ........ Raleigh
Branca, H. E., OALR [38] ........ Statesville
Brandon, Henry Allen, GP [70] ........ Yadkinville
Brandon, James Robert [31] ........ High Point
Brandon, Wesley Otis, GP [10] ........ Concord
Brantley, Hassell (Hon.), OALR [24] .... Spring Hope
Brantley, Julian Chisholm, GP [24] ........ Spring Hope
Brantley, Thomas H., U [10] ........ Concord
Bray, Thomas Latham, I [46] ........ Plymouth
Breeden, William Henry, Pd [20] ........ Fayetteville
Brenizer, Addison Gorgas (Hon.), S [48] .... Charlotte
*Brewer, James Street, GP [67] ........ Roseboro
*Brewton, William Allan, Ind [8] ........ Enka
*Brian, Earl Winfrey, I [74] ........ Raleigh
*Bridger, Dewey Herbert, GP [7] ........ Bladenboro
*Bridges, Dwight Thomas, GP [17] ........ Lattimore
Briggs, Henry Harrison, Jr., Oph [8] ........ Asheville
*Brinn, Thomas Preston, GP [16] ........ Hertford
Bristow, Charles Oliver, Pd [62] ........ Rockingham
Britt, James Norment, GP [63] ........ Lumberton
*Britt, Tilman Carlisle, PH [70] ........ Mt. Airy
*Brockmann, Harry Lyndon, S [31] ........ High Point
Brooks, Ernest Bruce, I [25] ........ Winston-Salem
Brooks, Fred Philips, I [59] ........ Greenville
Brooks, Harry Eskridge, GP [40] ........ Clayton
*Brooks, Ralph Elbert, U [1] ........ Burlington
Brookshire, Harley Gaskill (Hon.), GP [8] .. Asheville
Broughton, Arthur Calvin, Jr., GP [74] ........ Raleigh
*Broun, Matthew Singleton,
OALR [32] ........ Roanoke Rapids
Brouse, I E., R [52] ........ Wilmington
Brown, Charles W. [62] ........ Hamlet
Brown, Clarence Emanuel, GP [65] ........ Faith
Brown, Frank Reid, I [31] ........ Greensboro
Brown, George W. (Hon.), GP [37] ........ Raeford
Brown, James Arthur, Ob [65] ........ Cleveland
Brown, James Stevens, Sr. (Hon.),
GP [35] ........ Hendersonville
Brown, Kermit English, ObG [8] ........ Asheville
Brown, Landis Gold, S [52] ........ Southport
*Brown, Victor Emanuel, I&S [46] ........ Williamston
*Brown, William Moye Benjamin, ALR [59] .. Greenville
Brown, Winfred Earl, P [9] ........ Memphis, Tenn.
Brownsberger, Ethel May, GP [8] ........ Biltmore
Brunson, Edward Porcher, S [69] ........ Albemarle
Bryan, Lorenzo Dow (Hon.), GP [54] .... Sneads Ferry
Buchanan, Luther Thomas (Hon.),
GP [68] ........ Laurinburg
Buchanan, S. E. [10] ........ Concord
Buckner, James Marion (Hon.), S [8] ........ Swannanoa
Buffalo, J. S. (Hon.), GP [74] ........ Garner
*Bugg, Charles Richard, Pd [74] ........ Raleigh
Bugg, E. I., Jr., Or [23] ........ Durham
Buie, Roderick Mark, PH [31] ........ Greensboro
*Bulla, Alexander Chester, PH [74] ........ Raleigh
*Bullitt, James Bell (Hon.), Path [23] ........ Chapel Hill
Bullock, Duncan Douglas, GP [63] ........ Rowland
Bumgarner, John Reid [77] ........ North Wilkesboro
Bunch, Charles, S [48] ........ Charlotte

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Present at 1947 meeting.

Bundy, James B., GP $^{42}$........La Grange
Bundy, William Lumsden $^{77}$........North Wilkesboro
Bunn, J. J. $^{10}$........Mt. Pleasant
Bunn, Richard Wilmot, I $^{25}$........Winston-Salem
Burleson, William Brown (Hon.), GP $^{4}$....Plumtree
Burns, Joseph Eugene, Pd $^{10}$........Concord
Burr, A. H., U $^{25}$........Winston-Salem
Burt, Samuel Perry (Hon.), GP $^{26}$........Louisburg
Burton, Claude Naylor, ObG $^{8}$........Asheville
Burton, Herbert Walker, GP $^{61}$........Liberty
Burwell, John Cole, Jr., ObG $^{31}$........Greensboro
Burwell, Walter Brodie, I $^{23}$........Durham
Busby, George Francis, S $^{65}$........Salisbury
Busby, Julian, GP $^{10}$........Kannapolis
Busby, Julian Goode (Hon.), Pr&D $^{65}$........Salisbury
*Butler, Leroy Jefferson, Pd $^{25}$........Winston-Salem
Byerly, James Hampton, GP $^{41}$........Sanford
Byerly, Wesley Grimes, OALR $^{11}$........Lenoir
Bynum, C. C., GP $^{5}$........Belhaven
Byrd, Charles W., GP $^{33}$........Dunn
Byrd, William Carey, T $^{37}$........Raeford
Byrnes, Thomas Henderson, Path $^{48}$........Charlotte
Calder, Duncan Graham, Jr., S $^{10}$........Concord
*Caldwell, D. G., T $^{69}$........Albemarle
Caldwell, Lawrence McClure, GP $^{13}$........Newton
Caldwell, Robert Manfred, Ob $^{70}$........Mt. Airy
Callaway, Jasper Lamar, D $^{23}$........Durham
Camp, Horton, GP $^{14}$........Pittsboro
Cannon, Eugene Bolivia, $^{61}$........Asheboro
Cardwell, D. Willard, I $^{31}$........Greensboro
Carlton, Romulus Lee (Hon.),
PH $^{25}$........Winston-Salem
*Carpenter, Coy Cornelius, Path
& Ed $^{25}$........Winston-Salem
Carr, Catherine C., GP $^{8}$........Biltmore
Carr, Eugene Morrison, I $^{8}$........Asheville
*Carrington, George Lunsford, S $^{1}$........Burlington
*Carrington, Samuel Macon, S $^{29}$........Oxford
*Carroll, R. Charman, PN $^{8}$........Durham
Carter, Francis Bayard, ObG $^{23}$........Durham
Carter, Paul Conway, GP $^{64}$........Madison
*Carter, Warren Dallas, PH $^{2}$........Wadesboro
Casstevens, John Claude, GP $^{25}$........Winston-Salem
Casteen, Kenan, OALR $^{64}$........Leaksville
Castellow, Cola, S $^{6}$........Windsor
Cater, Clinton Duncan, Ob $^{31}$........Greensboro
Cathell, Edwin Jennings, S $^{21}$........Lexington
*Cathell, James Luther, S $^{21}$........Lexington
Caveness, William F., N $^{74}$........Raleigh
Caveness, Zebulan Marvin (Hon.), Pr $^{74}$....Raleigh
*Caviness, Verne Strudwick, I $^{74}$........Raleigh
Cayer, David, GE $^{25}$........Winston-Salem
*Cekada, Emil Bogomir, I $^{23}$........Durham
Chamblee, John S., PH $^{24}$........Nashville
Chandler, E. T., GP $^{54}$........Richlands
Chandler, Leon David $^{27}$........Gastonia
Chandler, Weldon P., GP $^{8}$........Weaverville
Chaplin, Steenie Charles, GP $^{46}$........Columbia
Chapman, Edwin James, ALR $^{8}$........Asheville
Cherry, James Henderson, Or $^{8}$........Asheville
*Chesson, Andrew L., S $^{74}$........Raleigh
Chester, Pinkney Jones, OALR $^{51}$....Southern Pines
*Choate, Allyn Blythe, I $^{48}$........Charlotte
Choate, Glenn $^{65}$........Salisbury
Choate, James Walter, GP $^{65}$........Salisbury
Clapp, Hubert Lee, GP $^{8}$........Swannanoa
Clark, Badie Travis, S $^{78}$........Wilson
Clark, DeWitt Duncan, GP $^{7}$........Clarkton
*Clark, Harold Stevens, S $^{8}$........Asheville
Clark, Lintner, R $^{74}$........Raleigh
Clark, Milton Stephen, I&A $^{76}$........Goldsboro
Clary, William Thomas, ObG $^{31}$........Greensboro
Clay, Earl Lewis, I $^{29}$........Oxford
*Clayton, Milton Burns, OALR $^{38}$..Washington, D. C.

Clement, Edward Buehler (Hon.),
OALR $^{65}$........Salisbury
*Cleveland, Parish Bowman, GP $^{28}$........Gatesville
Cliff, Benjamin Franklin, GP $^{40}$........Benson
Clinton, Roland Smith $^{27}$........Gastonia
Cloninger, Charles Edgar, GP $^{13}$........Conover
Clyatt, Claude Eugene, GP $^{21}$........Denton
*Cobb, Donnell Borden, S $^{76}$........Goldsboro
Cochrane, Fred Richard $^{48}$........Charlotte
Cochrane, James Daniel, GP $^{13}$........Newton
Cocke, Jere Ellis (Hon.) $^{8}$........Asheville
Codington, Herbert Augustus (Hon.),
S $^{52}$........Wilmington
Codnere, John T., U $^{8}$........Asheville
Coffey, James Cecil, Ind $^{65}$........Salisbury
Cogdell, David Melvin, GP $^{20}$........Fayetteville
Cole, Walter Francis (Hon.), Or $^{31}$........Greensboro
†Coleman, George Stephenson (Hon.), Pr $^{74}$..Raleigh
Coleman, Howe Reese, Jr., OALR $^{52}$....Wilmington
Collett, James R., GP $^{9}$........Morganton
Collings, Ruth Mary, GP $^{31}$........Greensboro
Combs, Fielding, ALR $^{25}$........Winston-Salem
*Combs, Joseph John, I $^{74}$........Raleigh
Conrad, Elizabeth, Pd $^{25}$........Winston-Salem
*Cook, Henry Lilly, Jr., OALR $^{31}$........Greensboro
Cook, Joseph Lindsay, GP $^{25}$........Winston-Salem
*Cook, William Eugene, T $^{1}$........Mebane
Cooke, Grady Carlyle, S$^{25}$........Winston-Salem
Cooke, H. M., GP $^{48}$........Charlotte
*Cooke, Quinton Edwin, GP $^{36}$........Murfreesboro
Cooke, Ralph M., GP $^{70}$........Elkin
Cooley, Samuel Studdiford, GP $^{8}$....Black Mountain
Cooper, Albert Derwin, A $^{23}$........Durham
Cooper, George Marion (Hon.), PH $^{74}$........Raleigh
*Coppridge, William Maurice, U $^{23}$........Durham
Corbett, Clarence Lee, GP $^{33}$........Dunn
Corbett, James Patrick, GP $^{54}$........Swansboro
Corbin, George W., Jr., GP $^{74}$........Wake Forest
*Cornell, William Sessions, S $^{48}$........Charlotte
*Cornwell, Abner Milton, S $^{43}$........Lincolnton
Corpening, Flave Hart, GP $^{35}$........Horse Shoe
Corpening, Oscar J. (Hon.), GP $^{11}$....Granite Falls
Corpening, William Nye, GP $^{11}$........Granite Falls
Costner, Walter Vance, Pd $^{43}$........Lincolnton
Couch, Vanderbilt Franklin,
OALR $^{25}$........Winston-Salem
Covington, Furman P., GP $^{21}$........Thomasville
Covington, James Madison, Jr., GP $^{2}$....Wadesboro
Covington, John Malloy Clayton,
OALR $^{32}$........Roanoke Rapids
Cox, Alexander McNeil, GP $^{64}$........Madison
Cox, Grover Steadman (Hon.), Pd $^{18}$....Tabor City
Cox, Samuel Clements, GP $^{54}$........Jacksonville
Cox, William Foscue, I $^{25}$........Winston-Salem
Cozart, Benjamin Franklin $^{64}$........Reidsville
Cozart, Samuel Rogers, GP $^{31}$........Greensboro
Cozart, Wiley Simon (Hon.),
GP $^{74}$........Fuquay Springs
Craddock, Alva Brown, I $^{8}$........Asheville
Craig, Robert Lawrence, N $^{23}$........Durham
*Craig, Sylvester Douglas (Hon.),
I $^{25}$........Winston-Salem
Crane, George L., I $^{23}$........Durham
Cranmer, John B. (Hon.), S $^{52}$........Wilmington
Cranz, Oscar William, S $^{42}$........Kinston
Craven, Franklin Clyde $^{61}$........Asheboro
Craven, Frederick Thorns, GP $^{10}$........Concord
Craven, Jean Davidson, Pd $^{21}$........Lexington
Craven, Thomas, GP $^{48}$........Huntersville
†Craven, William Wilhelm (Hon.), GP $^{48}$..Charlotte
Crawford, Robert Hope, S $^{66}$........Rutherfordton
Crawford, William Jennings, U $^{76}$........Goldsboro
Creadick, Robert N., ObG $^{23}$........Durham
Credle, Carroll Spencer, GP $^{6}$........Colerain
Credle, William Swindell, GP $^{6}$........Colerain
Creech, Bennett, GP $^{40}$........Selma

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* Present at 1947 meeting.

† Deceased.

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|---|---|
| Creech, Lemuel Underwood, GP $^{31}$ | High Point |
| Creed, George O., GP $^{68}$ | Wagram |
| Crisman, C. S., GP $^{1}$ | Graham |
| Crisp, Sellers Mark, Ob $^{59}$ | Greenville |
| Cromartie, Robert S. (Hon.), PH $^{7}$ | Elizabethtown |
| *Croom, A. B., GP $^{31}$ | High Point |
| Croom, Gabe Holmes, P $^{8}$ | Asheville |
| *Croom, Robert De Vane, Jr., GP $^{63}$ | Maxton |
| Crouch, Auley McRae, Sr., Pd $^{52}$ | Wilmington |
| Crouch, Auley McRae, Jr., Pd $^{52}$ | Wilmington |
| Crouch, Thomas Dalton (Hon.), GP $^{38}$ | Stoney Point |
| Crow, M. B., R $^{35}$ | Hendersonville |
| *Crow, Samuel Leslie, I $^{8}$ | Asheville |
| Crowell, James Allen, ObG $^{48}$ | Charlotte |
| Crowell, Lester Avant, Sr. (Hon.), S $^{43}$ | Lincolnton |
| *Crowell, Lester Avant, Jr., I $^{43}$ | Lincolnton |
| Crump, Cecil Lavon, OALR $^{8}$ | Asheville |
| Crump, George Curtis, I $^{8}$ | Asheville |
| Crumpler, Amos Gilmore, GP $^{74}$ | Fuquay Springs |
| Crumpler, James Fulton, Pd $^{24}$ | Rocky Mount |
| Crumpler, Paul (Hon.), GP $^{67}$ | Clinton |
| Crumpler, Warren H., GP $^{76}$ | Mt. Olive |
| Cummings, Michael Penn (Hon.), GP $^{64}$ | Reidsville |
| Currie, Daniel Smith (Hon.), GP $^{63}$ | Parkton |
| *Currie, Daniel Smith, Jr., OALR $^{20}$ | Fayetteville |
| *Cutchin, Joseph Henry (Hon.), GP $^{24}$ | Whitakers |
| *Cutchin, Joseph Henry, Jr., GP $^{32}$ | Roanoke Rapids |
| Dale, Grover Cleveland, GP $^{76}$ | Goldsboro |
| Dalton, Bennie Booker, GP $^{61}$ | Asheboro |
| Dalton, William B., GP $^{31}$ | Greensboro |
| Dalton, William Nicholson (Hon.), GP $^{25}$ | Winston-Salem |
| Daniel, L. Sam, GP $^{29}$ | Oxford |
| *Daniel, Walter Eugene, U $^{48}$ | Charlotte |
| *Daniels, Oscar Carroll (Hon.), OALR $^{55}$ | Oriental |
| Daniels, Robert E., GP $^{8}$ | Asheville |
| *Daughtridge, Arthur Lee, R $^{24}$ | Rocky Mount |
| Davenport, Carlton Alderman, GP $^{16}$ | Hertford |
| Davidian, Vartan A., S $^{40}$ | Smithfield |
| Davidson, John Alexander, U $^{23}$ | Durham |
| Davidson, John E. S. (Hon.), Oph $^{48}$ | Charlotte |
| Davis, Charles Burdis, GP $^{52}$ | Wilmington |
| Davis, Clarence L., S $^{23}$ | Durham |
| Davis, James Matheson, Pd $^{2}$ | Wadesboro |
| *Davis, James Wagner (Hon.), S $^{38}$ | Statesville |
| Davis, John Preston, I $^{25}$ | Winston-Salem |
| Davis, Joseph F. (Hon.), GP $^{31}$ | Greensboro |
| Davis, Philip Bibb, GP $^{31}$ | High Point |
| *Davis, Rachel Darden, Ob $^{42}$ | Kinston |
| *Davis, Richard Boyd (Hon.), S $^{31}$ | Greensboro |
| Davis, Thomas W. (Hon.), ALR $^{25}$ | Winston-Salem |
| Davison, Wilburt Cornell, Pd & Ed $^{23}$ | Durham |
| Dawson, James Nelson, GP $^{18}$ | Lake Waccamaw |
| Dawson, William Earl, GP $^{30}$ | Stantonsburg |
| Deans, Arthur Wood (Hon.), GP $^{24}$ | Battleboro |
| DeCamp, Allen Ledyard, ObG $^{48}$ | Charlotte |
| Dees, Daniel Alfonzo (Hon.), OALR $^{55}$ | Bayboro |
| Dees, John Essary, U $^{23}$ | Durham |
| *Dees, Ralph Erastus (Hon.), GP $^{31}$ | Greensboro |
| Dees, Rigdon Osmund (Hon.), GP $^{31}$ | Greensboro |
| Dees, Susan Coons, Pd $^{23}$ | Durham |
| Denton, Ausley Leo, GP $^{24}$ | Castalia |
| *Dewar, William Banks, I $^{74}$ | Raleigh |
| Dick, MacDonald, I $^{23}$ | Durham |
| Dickie, J. W., GP $^{52}$ | Wilmington |
| Dickinson, Elijah Thomas (Hon.), ALR $^{78}$ | Wilson |
| Dickinson, Kenneth D., Ob $^{74}$ | Raleigh |
| *Dickson, Malcolm Shields, GP $^{1}$ | Burlington |
| Dillard, George Penn $^{64}$ | Draper |
| Dimmette, J. A., GP $^{27}$ | Gastonia |
| Ditmore, Harry Boaz, GP $^{45}$ | Marshall |
| *Dixon, George Grady (Hon.), GP $^{59}$ | Ayden |
| Dixon, Guy E. (Hon.), PN $^{35}$ | Hendersonville |
| Dixon, P. L., Jr., GP $^{54}$ | Richlands |
| Dixon, William Harvey, Pr $^{24}$ | Rocky Mount |
| Doffermyre, Luther Randolph, GP $^{33}$ | Dunn |
| Donnelly, Grant Lester, GP $^{8}$ | Oteen |
| *Donnelly, James Ford, ObG $^{25}$ | Winston-Salem |
| †Donnelly, John (Hon.), T $^{48}$ | Charlotte |
| Dorenbusch, Alfred A., Otol $^{48}$ | Charlotte |
| *Dosher, William Sterling, ObG $^{52}$ | Wilmington |
| Dotterer, Elizabeth James, GP $^{41}$ | Sanford |
| Dotterer, John E., GP $^{41}$ | Sanford |
| Dowling, Judson Davie, Jr., GP $^{76}$ | Mt. Olive |
| Drake, Benjamin Michael, PH $^{64}$ | Leaksville |
| Draper, Arthur J., I $^{48}$ | Charlotte |
| Drummond, Charles Stitt, Pr $^{25}$ | Winston-Salem |
| Duck, Walter Otis, GP $^{45}$ | Mars Hill |
| Duckett, Virgil Howard, GP $^{34}$ | Canton |
| Duffy, Charles, Pd $^{19}$ | New Bern |
| Duffy, Richard Nixon (Hon.), S $^{19}$ | New Bern |
| Dula, Frederick Mast, S $^{11}$ | Lenoir |
| Duncan, Stacey Allen, GP $^{40}$ | Benson |
| Dunlap, Lucius Victor (Hon.), GP $^{69}$ | Albemarle |
| Dunn, Richard Berry, ObG $^{31}$ | Greensboro |
| Durant, Cary T. $^{60}$ | Tryon |
| Durham, Carey Winston, GP $^{31}$ | Greensboro |
| Dyer, John Wesley, GP $^{31}$ | High Point |
| Eagle, James Carr, GP $^{65}$ | Spencer |
| Eagle, Watt Weems, ALR $^{23}$ | Durham |
| Eagles, Charles Sidney (Hon.), GP $^{78}$ | Saratoga |
| Earle, Jesse Burns, Ob $^{14}$ | Siler City |
| Earp, Raymond Elmore, S $^{40}$ | Selma |
| Easley, Eleanor Beamer, ObG $^{23}$ | Durham |
| Easom, Herman Franklin, T $^{78}$ | Wilson |
| Eaves, Rupert Spencer, S $^{66}$ | Rutherfordton |
| Eckel, O. F. (Hon.), Anes $^{8}$ | Asheville |
| Eckbert, William Fox $^{27}$ | Cramerton |
| Eckerson, Charles Neil, GP $^{50}$ | Troy |
| *Edgerton, Glenn Souders, ObG $^{48}$ | Charlotte |
| Edmondson, Frank, Jr., GP $^{61}$ | Asheboro |
| *Edwards, Bertie Oscar (Hon.), I $^{8}$ | Asheville |
| Edwards, Forest D., Ob $^{43}$ | Lawndale |
| Edwards, Vertie Edward (Hon.), GP $^{31}$ | Greensboro |
| Eldridge, Charles Patterson, GP $^{74}$ | Raleigh |
| Eldridge, Harvey A., GP $^{33}$ | Dunn |
| Elfmon, Samuel Leon, I $^{20}$ | Fayetteville |
| Eller, Albert J. (Hon.), PH $^{77}$ | Wilkesboro |
| Eller, Carlton Reaves, GP $^{3}$ | West Jefferson |
| *Ellington, Amzi Jefferson (Hon.), OALR $^{1}$ | Burlington |
| Elliott, Avon Hall, PH $^{52}$ | Wilmington |
| Elliott, George Douglas, GP $^{18}$ | Fair Bluff |
| *Elliott, Joseph Alexander, D $^{48}$ | Charlotte |
| Elliott, Julian Carr, S $^{29}$ | Oxford |
| Elliott, William McBrayer, GP $^{66}$ | Forest City |
| Ellis, Elizabeth Lange, GP $^{31}$ | Greensboro |
| Ellis, Ralph V., A&I $^{31}$ | Greensboro |
| *Ennett, Nathaniel Thomas, PH $^{59}$ | Beaufort |
| Erb, Norris Scribner, GP $^{72}$ | Monroe |
| Erickson, Cyrus Conrad, Path $^{23}$ | Durham |
| Ervin, John Witherspoon, GP $^{9}$ | Morganton |
| *Erwin, E. A., GP $^{68}$ | Laurinburg |
| Etherington, John L., OALR $^{76}$ | Goldsboro |
| †Evans, John Ebenezer, S $^{52}$ | Wilmington |
| Ewers, Edwin Patterson, GP $^{22}$ | Warsaw |
| Fagan, Philip, GP $^{63}$ | Fairmont |
| *Faison, Elias Sampson, I $^{48}$ | Charlotte |
| Faison, Yates Wellington (Hon.), Pd $^{48}$ | Charlotte |
| Fales, Robert Martin, GP $^{52}$ | Wilmington |
| Falls, Fred, GP $^{17}$ | Shelby |
| Farmer, Joseph A., PN $^{23}$ | Durham |
| Farmer, William Anderson, S $^{20}$ | Fayetteville |
| Farmer William Dempsey, OALR $^{31}$ | Greensboro |
| Farmer, W. E., I $^{8}$ | Asheville |
| Farnsworth, David I. $^{8}$ | Oteen |
| Farrington, Joseph Allison Jackson $^{21}$ | Thomasville |
| Farrington, Reno Kirby, S $^{21}$ | Thomasville |
| Farrior, James William, GP $^{22}$ | Warsaw |
| *Farthing, John Watts, S $^{51}$ | Wilmington |

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* Present at 1947 meeting.

† Deceased.

Fassett, Burton Watson (Hon.), OALR $^{23}$..Durham
Faulk, James Grady, S $^{72}$........Monroe
Fauntleroy, Joseph Whittlesey, Ob $^{35}$........Zirconia
Fearing, Isaiah (Hon.), GP $^{56}$........Elizabeth City
Fearrington, James Cornelius Pass, I $^{25}$........Winston-Salem
Feezor, C. N., GP $^{65}$........Salisbury
Feldman, Leon Henry, I $^{8}$........Asheville
Felton, Robert Lee, Jr., GP $^{51}$........Carthage
*Fenner, Edwin Ferebee (Hon.) $^{73}$........Henderson
Fergus, Leroy Clark, S&GP $^{52}$........Southport
*Ferguson, George Burton, OALR $^{23}$........Durham
Ferguson, Robert Thrift, G $^{48}$........Charlotte
Ferneyhough, William Todd, OALR $^{64}$....Reidsville
Fetner, Lawrence Merrill, R $^{11}$........Lenoir
Fetzer, Paul William, GP $^{64}$........Reidsville
Field, Bob Lewis, GP $^{65}$........Salisbury
Fields, James Armstead $^{74}$........South Boston, Va.
*Fields, Leonard Earl, GP $^{23}$........Chapel Hill
Fike, Ralph Llewellyn, GP $^{78}$........Wilson
Finch, Ollie Edwin (Hon.), I $^{74}$........Raleigh
Fink, Emma Sloop, GP $^{1}$........Crossnore
Finney, Jonathan Richard $^{70}$........Boonville
Fisher, Ernest W., GP $^{44}$........Franklin
*Fitzgerald, Charles Edmund, GP $^{59}$........Farmville
Fitzgerald, John Dean, S $^{58}$........Roxboro
Fitzgerald, John Herbert, OALR $^{40}$........Smithfield
Fitzgerald, John Hill, Jr., GP $^{43}$........Lincolnton
Flagge, Philip Wesley (Hon.), I $^{31}$..Fair Hope, Ala.
Fleming, Fred Henry, GP $^{17}$........Coats
Fleming, Lawrence Edwin, S $^{48}$........Charlotte
*Fleming, Major Ivy, R $^{24}$........Rocky Mount
Fleming, Ralph Gibson, GP $^{23}$........Durham
Flippin, James Meigs (Hon.), GP $^{70}$..Pilot Mountain
Flippin, Samuel T. (Hon.), GP $^{70}$........Siloam
Flowers, Charles Ely (Hon.), ObG $^{74}$........Zebulon
Floyd, Anderson Gayle, GP $^{18}$........Whiteville
Floyd, Lawrence Dowe (Hon.), GP $^{18}$........Fair Bluff
Floyd, William Russell, S $^{10}$........Concord
Flythe, William Henry, GP $^{31}$........High Point
Folger, Paul Bernays, GP $^{70}$........Dobson
Forbes, Thomas Earl, GP $^{64}$........Reidsville
Forbus, Wiley Davis, Path $^{23}$........Durham
Ford, David Emerson, PH $^{5}$........Washington
Ford, Fred, GP $^{63}$........Maxton
Forrest, Daniel Efland, GP $^{23}$........Hillsboro
Forsyth, H. Francis, Or $^{25}$........Winston-Salem
Fortescue, William Nicholas, GP $^{35}$..Hendersonville
Fortune, Alexander Fletcher (Hon.), GP $^{31}$........Greensboro
Fortune, Benjamin Fletcher $^{31}$........Greensboro
Foster, Clarence B., Oph $^{48}$........Charlotte
*Foster, Howitt H., GP $^{75}$........Norlina
*Foster, John Franklin, Pd $^{41}$........Sanford
Foster, Malcolm Tennyson, PH $^{20}$........Fayetteville
*Fowler, Shelton F., GP $^{11}$........Lenoir
Fowlkes, W. M., Jr., GP $^{32}$........Enfield
Fox, Dennis Bryan, S $^{69}$........Albemarle
Fox, Frances Hill, I $^{23}$........Durham
Fox, Herbert Junius, I $^{23}$........Durham
*Fox, Norman Albright, GP $^{31}$........Greensboro
Fox, Powell Graham, U $^{74}$........Raleigh
Fox, Robert Eugene, PH $^{74}$........Raleigh
Fox, S. Frank, S $^{23}$........Durham
Franklin, Ernest Washington, ObG $^{48}$........Charlotte
Franklin, Robert Benjamin Clinton, PH $^{70}$..Mt. Airy
Frazier, John Wesley, Jr. $^{65}$........Salisbury
Freedman, Arthur, I $^{31}$........Greensboro
Freeman, Alton Brown, GP $^{61}$........Randleman
Freeman, Jere David, OALR $^{52}$........Wilmington
Freeman, Percy L., U $^{27}$........Gastonia
Freeman, Robert Herman, GP $^{74}$........Raleigh
Freeman, W. H., GP $^{22}$........Warsaw
Freeman, William Talmage, Pd $^{8}$........Biltmore
Fresh, William Maurice, OALR $^{13}$........Hickory
Fritz, Jacob Luther, ALR $^{61}$........Asheboro
Fritz, Oliver Grady, GP $^{25}$........Walkertown
Fritz, William Abel, GP $^{13}$........Hickory
Frizzelle, Mark T. (Hon.), GP $^{59}$........Ayden
Frye, Glenn Raymer, S $^{13}$........Hickory
Fuller, Henry Fleming, ObG $^{42}$........Kinston
Fulp, James Francis, GP $^{64}$........Stoneville
*Furgurson, Ernest Whitmal, GP $^{46}$........Plymouth
Furman, William H. (Hon.) $^{73}$........Henderson
Futrell, Lokie Melton, GP $^{36}$........Murfreesboro
Gage, Lucius Gaston, I $^{48}$........Charlotte
Gallant, Robert Miller (Hon.), GP $^{48}$........Charlotte
Gambill, Ira Samuel $^{70}$........Elkin
Gamble, John R., Jr., GP $^{43}$........Lincolnton
Gambrell, Grover Cleveland, PH $^{21}$........Lexington
*Gardner, Clarence Ellsworth, Jr., S $^{23}$........Durham
Garren, Robert Hall (Hon.), OALR $^{72}$........Monroe
Garrenton, Connell, T $^{59}$........Bethel
Garrett, Frank Bernard (Hon.), OALR $^{62}$........Rockingham
*Garrison, Ralph Bernard, Ob $^{62}$........Hamlet
*Garriss, Frank Henry, PH $^{5}$........Lewiston
Garvey, Fred Kesler, U $^{25}$........Winston-Salem
Garvey, Robert Robey, U $^{3}$........Blowing Rock
Garvin, David O., PH $^{23}$........Chapel Hill
Gaskin, John Stover, GP $^{69}$........Albemarle
Gaskin, Lewis Roy, GP $^{69}$........Albemarle
Gaskin, Madge Baker, G $^{69}$........Albemarle
Gast, Charlotte Marie $^{13}$........Hickory
Gaul, John Stuart, Or $^{48}$........Charlotte
*Gay, Charles Houston, P $^{48}$........Charlotte
Geddie, Kenneth Baxter, Pd $^{31}$........High Point
Gentry, George W. (Hon.), GP $^{58}$........Roxboro
Gibbon, James Wilson, S $^{48}$........Charlotte
Gibbon, Robert Lardner (Hon.), S $^{48}$........Charlotte
Gibbons, George W., GP $^{34}$........Canton
Gibbs, Emmett Wyattman, GP $^{17}$........Shelby
Gibson, F. D., Jr., GP $^{63}$........Fairmont
Gibson, Lauren Osborne (Hon.), ObG $^{38}$..Statesville
*Gibson, Milton Reynolds (Hon.), OALR $^{74}$..Raleigh
Gibson, M. W., GP $^{14}$........Goldston
Gilbert, Donald Roscoe, GP $^{60}$........Melvin Hill
Gilbert, Edward Lee, GP $^{25}$........Winston-Salem
Gilbert, George G., U $^{8}$........Asheville
Gill, Joseph Armstrong, GP $^{56}$........Elizabeth City
Gilland, John deSaussure, S $^{48}$........Charlotte
Gillespie, Samuel Crawford, I $^{8}$........Asheville
Gilmore, Clyde Manly, I $^{31}$........Greensboro
*Gilmour, Monroe Taylor, I $^{48}$........Charlotte
Gilreath, Frank Hackett (Hon.), $^{77}$........North Wilkesboro
Gleitz, Allan A., S $^{54}$........Jacksonville
Glenn, Channing, GP $^{7}$........Elizabethtown
Glenn, Charles Foster, S $^{66}$........Rutherfordton
Glenn, Dorothy Norman, GP $^{27}$........Gastonia
Glenn, Henry Franklin, Jr., GP $^{27}$........Gastonia
Glenn, Lucius Newton (Hon.), S $^{27}$........Gastonia
Goddard, David W. $^{23}$........Durham
Gold, Ben, Pd $^{17}$........Shelby
Goley, Willard Coe, G $^{1}$........Graham
Goode, Thomas Vance (Hon.), S $^{38}$........Statesville
Goodman, E. G., I $^{23}$........Wilmington
*Goodwin, Cleon Walton, S $^{78}$........Wilson
Goodwin-Barbour, Edith, GP $^{9}$........Morganton
*Goodwin, Oscar Sexton, GP $^{74}$........Apex
Gordon, John Simpson, ALR $^{48}$........Charlotte
Gorham, Herbert Jenkins, GP $^{24}$........Nashville
Goswick, Harry Wilson, Jr., S $^{25}$....Winston-Salem
Goudelock, John Jeffries, U $^{72}$........Monroe
Goudge, Mabel Ensworth, P $^{23}$........Durham
Gouge, Arthur Edward, GP $^{49}$........Bakersville
Gove, Anna M. (Hon.), GP $^{31}$........Greensboro
Grady, Edward Stephen, Ob $^{40}$........Smithfield
Grady, Franklin M., GP $^{19}$........New Bern
Grady, James C. (Hon.), GP $^{40}$........Kenly
Graham, Charles Pattison, S $^{52}$........Wilmington

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* Present at 1947 meeting.

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| Graham, William Alexander, ObG $^{23}$ | Durham |
| Grantham, Wilmer Lloyd (Hon.), U $^{8}$ | Asheville |
| *Graves, Robert Williams, N $^{23}$ | Durham |
| *Gray, Cyrus Leighton, R $^{31}$ | High Point |
| Grayson, Charles Shober (Hon.), Ob $^{31}$ | High Point |
| Green, William Wills (Hon.), S $^{24}$ | Tarboro |
| Greene, Garland V., GP $^{65}$ | Mocksville |
| Greene, James Verdery, GP $^{20}$ | Fayetteville |
| Greene, Joseph Berry (Hon.), OALR $^{8}$ | Asheville |
| Greene, Phares Yates, GP $^{1}$ | Burlington |
| *Greene, William Alexander, GP $^{18}$ | Whiteville |
| *Greenhill, Maurice Herzberger, PN $^{23}$ | Durham |
| Greenwood, James G., Hosp. Res. $^{48}$ | Charlotte |
| Grier, Charles Talmadge (Hon.) $^{51}$ | Carthage |
| Grier, John C., P $^{51}$ | West End |
| Griffin, Harvey Lee, GP $^{61}$ | Asheboro |
| Griffin, Harold Walker, OALR $^{13}$ | Hickory |
| Griffin, Leslie W., GP $^{33}$ | Erwin |
| Griffin, Mark Alexander, P $^{8}$ | Asheville |
| *Griffin, William Ray (Hon.), PN $^{8}$ | Asheville |
| Griffis, John William $^{21}$ | Denton |
| Griffith, Franklin Webb (Hon.), S $^{8}$ | Asheville |
| Griffith, Lewie Muller, OALR $^{8}$ | Asheville |
| Griffith, Mary Irene, Ob $^{25}$ | Winston-Salem |
| Griggs, Boyce P., GP $^{43}$ | Lincolnton |
| Grimes, William Lawrence (Hon.), S $^{25}$ | Winston-Salem |
| *Grimson, Keith Sanford, S $^{23}$ | Durham |
| Groome, James Gordon, GP $^{31}$ | High Point |
| Groves, Robert Burwell, GP $^{27}$ | Lowell |
| Gunter, June U. $^{23}$ | Durham |
| Gurganus, George Elwood, GP $^{54}$ | Jacksonville |
| Gwynn, Houston Lafayette, GP $^{1}$ | Yanceyville |
| *Haar, Frederick Behrend, Pd $^{59}$ | Greenville |
| *Hackler, Robert Hardin, Jr., R $^{5}$ | Washington |
| Hadley, Herbert W. $^{59}$ | Greenville |
| Hagaman, John Bartlett (Hon.), GP $^{3}$ | Boone |
| Hagaman, Len Doughton, PH $^{3}$ | Boone |
| *Hagna, Lewis William, GP $^{47}$ | Marion |
| Haines, Hilton D., ObG $^{62}$ | Rockingham |
| Hall, William Dewey, P $^{32}$ | Roanoke Rapids |
| Ham, Clem, PH $^{72}$ | Monroe |
| Hamblen, Edwin Crowell, I $^{23}$ | Durham |
| Hambrick, Robert Theodore, Pr $^{13}$ | Hickory |
| Hamer, Alfred Wilson, GP $^{9}$ | Morganton |
| Hamer, Douglas, Jr., U $^{11}$ | Lenoir |
| Hamer, Eugene F., GP $^{72}$ | Monroe |
| Hamer, William Alexander, Anes $^{48}$ | Charlotte |
| Hamilton, Alfred T., S $^{74}$ | Raleigh |
| Hamilton, John Homer, PH $^{74}$ | Raleigh |
| Hammond, Alfred Franklin, Jr., GP $^{19}$ | New Bern |
| *Hamrick, John Carl, S $^{17}$ | Shelby |
| Hamrick, Ladd Watts, Jr., $^{17}$ | Boiling Springs |
| Hand, Edgar Hall (Hon.), PH $^{48}$ | Charlotte |
| *Hansen-Pruss, Oscar Carl Edward, I $^{23}$ | Durham |
| Harbison, John William, S $^{17}$ | Shelby |
| Hardee, Walter Person, OALR $^{23}$ | Durham |
| Harden, Boyd, GP&S $^{1}$ | Burlington |
| Harden, Graham, GP $^{1}$ | Burlington |
| Harden, Robert Norman, S $^{31}$ | Greensboro |
| Harder, Frank Kirby, PH $^{31}$ | Greensboro |
| Hardin, Eugene Ramsey, PH $^{63}$ | Lumberton |
| Harding, B. H., $^{70}$ | Brooks Cross Roads |
| Harding, Samuel Asberry (Hon.), GP $^{65}$ | Mocksville |
| Hardy, Ira May (Hon.), ALR $^{42}$ | Kinston |
| Hardymon, Philip, S $^{25}$ | Winston-Salem |
| Hare, Ransom Bryant, U $^{52}$ | Wilmington |
| Harmon, Raymond Harris, $^{3}$ | Boone |
| †*Harper, Frank Trumbo, T $^{1}$ | Burlington |
| Harper, James Henry (Hon.), Pd $^{30}$ | Snow Hill |
| *Harrell, George Thomas, Jr., I $^{23}$ | Winston-Salem |
| Harrell, Leon Jackson $^{76}$ | Goldsboro |
| Harrell, W. Fletcher, P $^{48}$ | Charlotte |
| Harrell, William Horace, GP $^{46}$ | Creswell |
| *Harrill, Henry Clay, U $^{31}$ | Greensboro |
| Harrill, James Albert, ALR $^{25}$ | Winston-Salem |
| Harrill, Lawson Baxter (Hon.), S $^{66}$ | Caroleen |
| Harris, Charles I., Jr., GP&S $^{46}$ | Williamston |
| *Harris, Isaac E., Jr., S $^{23}$ | Durham |
| Harris, J. Robert $^{62}$ | Rockingham |
| Harris, Jerome S., Pd $^{23}$ | Durham |
| Harris, Loftin, GP $^{69}$ | Norwood |
| Harris, Russell P., S $^{64}$ | Leaksville |
| Harrison, Edmund (Hon.), GP $^{31}$ | Greensboro |
| Harriss, Andrew Howell (Hon.), GP $^{52}$ | Wilmington |
| Harry, John McKamie, U $^{20}$ | Fayetteville |
| Hart, Julian Deryl, S $^{23}$ | Durham |
| Hart, Oliver James, U $^{25}$ | Winston-Salem |
| *Hart, Verling Kersey, ALR $^{48}$ | Charlotte |
| Hartman, Bernhard Henry, P $^{8}$ | Asheville |
| Hartness, William Rufus, GP $^{41}$ | Jonesboro |
| Harton, Roman Albert, GP $^{23}$ | Durham |
| Harvey, Wallace Watson, GP $^{31}$ | Greensboro |
| *Hatcher, Martin Armstead, U $^{62}$ | Hamlet |
| Hatcher, Samuel W., GP $^{12}$ | Morehead City |
| Hawes, Charles Forest, GP $^{22}$ | Rose Hill |
| Hawes, George Aubrey, U $^{48}$ | Charlotte |
| Hawes, James Beebe, OALR $^{59}$ | Greenville |
| *Hayes, James, GP $^{63}$ | Fairmont |
| *Haywood, Hubert Benbury (Hon.), I $^{74}$ | Raleigh |
| Head, William Thomas, GP $^{66}$ | Melvin Hill |
| *Hedgpeth, Edward McGowan, I $^{23}$ | Chapel Hill |
| Hedgpeth, Emmett Martin, GP $^{58}$ | Roxboro |
| *Hedgpeth, Louten Rhodes, OALR $^{63}$ | Lumberton |
| Hedgpeth, William Carey, ObG $^{63}$ | Lumberton |
| *Hedrick, Clyde Reitzel, C $^{11}$ | Lenoir |
| Hedrick, Richard E., GP $^{25}$ | Walkertown |
| Heffner, B. L., I $^{31}$ | Greensboro |
| Hege, John Roy (Hon.), PH $^{14}$ | Concord |
| †Heighway, Sheridan C. (Hon.), GP $^{15}$ | Murphy |
| Heinitsh, George, OALR $^{51}$ | Southern Pines |
| *Helms, Jefferson Bivins, S $^{9}$ | Morganton |
| Helms, Thomas Leck, GP $^{61}$ | Randleman |
| Helsabeck, Belmont Augustus, GP $^{25}$ | Winston-Salem |
| Helsabeck, Chester Joseph, GP $^{25}$ | Walnut Cove |
| Helsabeck, Rupert Sylvester, GP $^{25}$ | King |
| Hemphill, Clyde Hoke, OALR $^{47}$ | Highlands |
| *Hemphill, James Eugene, R $^{48}$ | Charlotte |
| Henderson, Clair Crouse, GP $^{76}$ | Mt. Olive |
| *Henderson, John Percy, GP $^{54}$ | Jacksonville |
| Henderson-Smathers, Irma Carlene, ObG $^{8}$ | Asheville |
| Hendrick, Harry V. $^{66}$ | Rutherfordton |
| Hendrickson, Glenn G., S $^{48}$ | Charlotte |
| Hendrix, James Paisley, I $^{23}$ | Durham |
| *Henley, Ruth Dixon, Ob $^{25}$ | Winston-Salem |
| Henley, Thomas F., Pd $^{25}$ | Winston-Salem |
| Henry, Hector Himel, PH $^{48}$ | Charlotte |
| Henry, Tidal Boyce, I $^{62}$ | Rockingham |
| *Hensley, Charles Albert, OALR $^{8}$ | Asheville |
| *Henson, Thomas Albert $^{31}$ | Greensboro |
| Herbert, William P. (Hon.), S $^{8}$ | Asheville |
| Herrin, Hermon Keith $^{27}$ | Gastonia |
| Herring, Edward Humphrey, GP $^{74}$ | Raleigh |
| Herring, Robert Alexander, PH $^{31}$ | High Point |
| Herring, Tilghman $^{78}$ | Wilson |
| *Hesser, Frederick H., P $^{23}$ | Durham |
| Hester, Joseph Robert, GP $^{74}$ | Wendell |
| Hester, William Shepherd, S $^{64}$ | Reidsville |
| *Hiatt, Joseph S., Jr., T $^{37}$ | Sanatorium |
| Hickman, Harry Stuart $^{11}$ | Lenoir |
| *Hicks, Calvin Shaw (Hon.), GP $^{23}$ | Durham |
| *Hicks, Vonnie Monroe, Oph $^{74}$ | Raleigh |
| Highsmith, Jacob Frank, Jr., S $^{20}$ | Fayetteville |
| Highsmith, William Cochran, I $^{20}$ | Fayetteville |
| *Hightower, Felda, S $^{25}$ | Winston-Salem |
| Hilborn, Caroline Lunetta, GP $^{51}$ | Robbins |
| Hilborn, Robert Ross, GP $^{51}$ | Robbins |
| Hill, Abel Le Compte, GP $^{17}$ | Kings Mountain |
| Hill, F. Burnarde, GP $^{10}$ | Concord |
| *Hill, Millard Daniel, D $^{74}$ | Raleigh |

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* Present at 1947 meeting.

† Deceased.

Hill, William Henry, GP $^{69}$ .... Albemarle
Hill, William Isaac (Hon.), GP $^{69}$ .... Albemarle
Himmelwright, G. G., S $^{5}$ .... Washington
Hinnant, Milford (Hon.), GP $^{40}$ .... Micro
*Hipp, Edward Reginald, S $^{48}$ .... Charlotte
*Hitch, Joseph Martin, D $^{74}$ .... Raleigh
*Hodges, Horace Hayden, I $^{48}$ .... Charlotte
Hodgin, Henry Hiram (Hon.), GP $^{63}$ .. Red Springs
Hoggard, John Thomas, GP $^{52}$ .... Wilmington
*Hoggard, William Alden (Hon.), GP $^{16}$ .... Hertford
*Hoggard, William A., GP $^{56}$ .... Manteo
Holbrook, Joseph Samuel, GP $^{38}$ .... Statesville
Holden, Howard Thompson, OALR $^{48}$ .... Charlotte
Hollister, William, GP $^{19}$ .... New Bern
Holloway, Joseph Clark, GP $^{23}$ .... Durham
*Hollowell, Claude Velmont $^{76}$ .... Goldsboro
Hollyday, William Murray (Hon.), OALR $^{8}$ .... Asheville
Holmes, Andrew Byron (Hon.), GP $^{63}$ .... Fairmont
Holmes, F. H., GP $^{78}$ .... Stantonsburg
*Holmes, George Washington, Or $^{25}$ .. Winston-Salem
Holt, Duncan Waldo, GP $^{31}$ .... Greensboro
Holt, Thomas Jefferson (Hon.), OALR $^{75}$ .... Warrenton
Holt, William Preston (Hon.), S $^{33}$ .... Erwin
Holton, A. J., GP $^{17}$ .... Fallston
Holton, Thomas Jefferson, OALR $^{48}$ .... Charlotte
Hooper, Delos D. $^{39}$ .... Sylva
Hooper, Joseph Ward (Hon.), S $^{52}$ .... Wilmington
Hoot, M. P., OALR $^{59}$ .... Greenville
Hoover, Charles Henry (Hon.), GP $^{43}$ .... Crouse
Hoover, William Alonzo, S $^{15}$ .... Murphy
Hope, Alex Chalmers, S&G $^{48}$ .... Charlotte
Horsley, W. H. $^{27}$ ....
*Horton, Miles Christopher (Hon.), GP $^{74}$ .... Raleigh
Horton, William Calvin (Hon.), Pr $^{74}$ .... Raleigh
Horton, William H., GP $^{74}$ .... Wendell
Hoskins, William H., GP $^{22}$ .... Wallace
Houser, Emanuel Alvin (Hon.), GP $^{17}$ .... Shelby
*Houser, Forrest Melville, GP $^{26}$ .... Cherryville
Houser, Oscar Julian (Hon.), OALR $^{48}$ .... Charlotte
Hovis, Leighton Watson (Hon.), OALR $^{48}$ .... Charlotte
Howard, Corbett Etheridge, R $^{76}$ .... Goldsboro
Howard, John Richard, ObG $^{18}$ .... Lake Waccamaw
Howard, J. Cooper $^{27}$ .... Cherryville
*Howell, William Lawrence (Hon.), GP $^{62}$ .... Ellerbe
*Hubbard, Frederic Cecil, S $^{77}$ .... North Wilkesboro
Hudson, Miles, GP $^{9}$ .... Valdese
Huffines, Thomas Ruffin, U $^{8}$ .... Asheville
Hundley, Deane, Jr., GP $^{22}$ .... Wallace
Hunt, James F. (Hon.), GP $^{66}$ .... Spindale
Hunt, Jasper Stewart, Pd $^{48}$ .... Charlotte
Hunt, William Bryce, GP $^{21}$ .... Lexington
*Hunter, Frank Patterson, GP $^{75}$ .... Warrenton
Hunter, J. B. $^{17}$ .... Shelby
Hunter, John F. C., R $^{22}$ .... Magnolia
Hunter, John Pullen, GP $^{74}$ .... Cary
Hunter, Shelton B., Jr., GP $^{40}$ .... Kenly
Hunter, William Blair, PH $^{33}$ .... Lillington
Hunter, William Cooper, I $^{78}$ .... Wilson
Hurdle, Samuel Walker (Hon.), GP $^{25}$ .... Winston-Salem
Hussey, Howard S., Hosp. Res. $^{24}$ .... Tarboro
*Huston, John Walter (Hon.), T $^{8}$ .... Asheville
Hutaff, Lucille, I $^{25}$ .... Winston-Salem
Hutchinson, Sankey Smith (Hon.), S $^{7}$ .. Bladenboro
Hyde, Frank Edward, ObG $^{12}$ .... Beaufort
Irmen, F. A., NP $^{74}$ .... Raleigh
*Irons, C. Fred, GP $^{59}$ .... Greenville
Irons, Maline G., P $^{59}$ .... Greenville
*Irwin, Henderson (Hon.), GP $^{76}$ .... Eureka
*Ivey, Henry B. (Hon.), R $^{76}$ .... Goldsboro
Ivey, Robert Robbins, S $^{8}$ .... Asheville
Izlar, Henry LeRoy (Hon.), GP $^{25}$ .... Winston-Salem
Jackson, Marshall Vaden, GP $^{40}$ .... Princeton

Jackson, Walter Lee (Hon.), S $^{31}$ .... High Point
*Jacobs, Julian Erich John, Or $^{48}$ .... Charlotte
Jacobs, Paul, GP $^{8}$ .... Oteen
Jacocks, W. P. (Hon.), PH $^{74}$ .... Raleigh
James, Arthur Augustus, Jr., GP $^{41}$ .... Sanford
*James, Fairley Patterson (Hon.), GP $^{68}$ .. Laurinburg
†James, William Daniel (Hon.), S $^{62}$ .... Hamlet
James, William Duer, S $^{62}$ .... Hamlet
Jarman, Fontaine Graham (Hon.), S $^{32}$ .... Roanoke Rapids
Jaskunas, S. R. $^{27}$ .... Gastonia
Jeffreys, Everett O., NS $^{25}$ .... Winston-Salem
Jennings, Edward C., OALR $^{42}$ .... Kinston
Jennings, Royal Garfield, GP $^{21}$ .... Thomasville
Jervey, Allen Jones, S $^{60}$ .... Tryon
Jervey, William St. Julien $^{60}$ .... Tryon
Johnson, Amos Neill, GP $^{67}$ .... Garland
Johnson, Charles Thomas, GP $^{63}$ .... Red Springs
Johnson, Floyd (Hon.), PH $^{18}$ .... Whiteville
Johnson, Gaston Frank, R $^{25}$ .... Winston-Salem
Johnson, George W., ObG $^{52}$ .... Wilmington
*Johnson, Harry Lester, GP $^{70}$ .... Elkin
Johnson, Jeremiah Robert, S $^{70}$ .... Elkin
Johnson, John Brown, S $^{47}$ .... Old Fort
Johnson, John Ralph, GP $^{33}$ .... Dunn
Johnson, Joseph Lewis, GP $^{1}$ .... Graham
Johnson, Julius D., OALR $^{17}$ .... Shelby
Johnson, L. Meredith, T $^{37}$ .... Sanatorium
Johnson, Paul William, Ob $^{25}$ .... Winston-Salem
Johnson, Walter Royle, I $^{8}$ .... Asheville
Johnson, William Alexander (Hon.), GP $^{64}$ .... Reidsville
*Johnson, Wingate Memory (Hon.), I $^{25}$ .... Winston-Salem
Johnston, Christopher, I $^{23}$ .... Durham
Johnston, James Gilliam (Hon.), OALR $^{48}$ .... Charlotte
Johnston, Joseph B., Jr., I $^{10}$ .... Kannapolis
Johnston, Wiley Warren, ObG $^{56}$ .... Manteo
Johnston, William Oliver, I $^{48}$ .... Charlotte
Jolley, John William, OALR $^{70}$ .... Elkin
Jonas, John Frank (Hon.), GP $^{47}$ .... Marion
Jones, Arthur Lee, GP $^{3}$ .... Lansing
*Jones, Beverly Nicholas, ALR $^{25}$ .... Winston-Salem
*Jones, Beverly Nicholas, Jr., OALR $^{25}$ .... Winston-Salem
Jones, Clyde T., GP $^{3}$ .... West Jefferson
Jones, Craig, S $^{17}$ .... Shelby
Jones, Dean Cicero, GP $^{3}$ .... Jefferson
Jones, Donnie H., Jr., GP $^{40}$ .... Princeton
Jones, Frank Woodson, S $^{13}$ .... Newton
Jones, Grace Germania, S $^{48}$ .... Charlotte
Jones, Ira S., GP $^{11}$ .... Lenoir
Jones, M. E., GP $^{11}$ .... Granite Falls
Jones, Millard F., GP $^{24}$ .... Rocky Mount
*Jones, Otis Hunter, Ob $^{48}$ .... Charlotte
Jones, Ransom J., PH $^{42}$ .... Kinston
Jones, Thomas Thweatt, D $^{23}$ .... Durham
Jones, William McConnell, Pd $^{27}$ .... Gastonia
Jones, William Samuel, GP $^{24}$ .... Nashville
Joyner, George William, S $^{61}$ .... Asheboro
*Joyner, Powell Winfred, GP $^{32}$ .... Enfield
Judd, Glenn Ballentine, GP $^{74}$ .... Varina
†Judd, James M. (Hon.), GP $^{74}$ .... Varina
Junkin, William M., S $^{13}$ .... Hickory
*Justa, Samuel Harry, U $^{24}$ .... Rocky Mount
Justice, Frank, GP $^{44}$ .... Franklin
Justice, Gaston B. (Hon.), GP $^{47}$ .... Marion
Justice, William Shipp, S $^{8}$ .... Asheville
Kafer, Oscar Adolph, GP $^{19}$ .... New Bern
Kahn, Joseph W., GP $^{44}$ .... Franklin
Kapp, Constantine Hege, GP $^{25}$ .... Winston-Salem
Karansky, Stanley GP $^{8}$ .... Enka
Kavanagh, William Paul $^{65}$ .... Cooleemee
Keever, James Woodfin, T $^{13}$ .... Hickory
Keiger, Oscar R. (Hon.), GP $^{25}$ .... Winston-Salem

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* Present at 1947 meeting.

† Deceased.

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|---|---|
| *Keiter, William Eugene, Pd $^{42}$ | Kinston |
| *Keith, Marion Yates, Pd $^{31}$ | Greensboro |
| Keithan, John F., S $^{8}$ | Asheville |
| Kell, Thornton, S $^{11}$ | Lenoir |
| Kelly, Luther Wrentmore, I $^{48}$ | Charlotte |
| Kelsey, Weston M., Pd $^{25}$ | Winston-Salem |
| Kempner, Walter, I $^{23}$ | Durham |
| Kendall, Benjamin Horton, GP $^{17}$ | Shelby |
| Kendall, John Harold, GP $^{67}$ | Clinton |
| Kendrick, Charles Mattox, I $^{11}$ | Lenoir |
| *Kennedy, John Pressly, S $^{48}$ | Charlotte |
| Kennedy, Leon Toland, PH $^{48}$ | Charlotte |
| Kent, Alfred Abraham, Jr., GP $^{11}$ | Granite Falls |
| Kernodle, Harold B., Or $^{1}$ | Burlington |
| *Kerns, Thomas Cleveland (Hon.), OALR $^{23}$ | Durham |
| Kerr, James Edwin (Hon.), GP $^{25}$ | Winston-Salem |
| *Kerr, Joseph T., S $^{78}$ | Wilson |
| Kesler, Robert Cicero, OALR $^{20}$ | Fayetteville |
| Ketchie, James Meredith $^{65}$ | Salisbury |
| Ketner, Fred Yadkin, GP $^{10}$ | Concord |
| Kibler, William Herbert, ALR $^{9}$ | Morganton |
| Killian, Frank McClure, OALR $^{44}$ | Franklin |
| Kimmelstiel, Paul, Path $^{48}$ | Charlotte |
| King, Duncan Ingraham Campbell, Pd $^{35}$ | Hendersonville |
| King, Edward, Anes $^{8}$ | Asheville |
| *King, Edward Sandling, Pd & Bact $^{25}$ | Winston-Salem |
| King, Parks McCombs (Hon.), GP $^{48}$ | Charlotte |
| King, Richard Morrison (Hon.), GP $^{10}$ | Concord |
| King, Robert, I $^{20}$ | Fayetteville |
| *King, Robert Rogers, Jr., PH $^{3}$ | Boone |
| Kinlaw, J. B., GP $^{63}$ | Rowland |
| Kinlaw, Murray Carlyle, GP $^{63}$ | Pembroke |
| Kirby, Guy S. (Hon.), GP $^{47}$ | Marion |
| Kirby, William Leslie, D $^{25}$ | Winston-Salem |
| Kirchberg, Roy William $^{39}$ | Sylva |
| Kirk, William Redin (Hon.), I $^{35}$ | Hendersonville |
| Kirkpatrick, William L. (Hon.), GP $^{34}$ | Waynesville |
| Kirksey, James Jackson, Pd $^{9}$ | Morganton |
| Kirksey, William Albert, GP $^{9}$ | Morganton |
| Kitchin, Thurman D. (Hon.), Ed $^{74}$ | Wake Forest |
| Kittleson, Horace O., GP $^{8}$ | Asheville |
| Kleiman, David, I $^{74}$ | Raleigh |
| Klenner, Fred Robert $^{64}$ | Reidsville |
| Kneedler, William Harding, I $^{48}$ | Charlotte |
| *Knight, Floyd Lafayette, S $^{41}$ | Sanford |
| Knoefel, Arthur Eugene, Jr., GP $^{8}$ | Black Mountain |
| *Knowles, Daniel Lamont, GP $^{24}$ | Rocky Mount |
| Knox, John (Hon.), GP $^{63}$ | Lumberton |
| Knox, Joseph Clyde, PH $^{52}$ | Wilmington |
| Kodack, Albert, GP&S $^{8}$ | Asheville |
| Koogler, Benjamin Robert, GP $^{50}$ | Candor |
| *Koonce, Donald B., S $^{52}$ | Wilmington |
| *Koonce, S. Everett (Hon.), OALR $^{52}$ | Wilmington |
| Koontz, E. Ransom, $^{8}$ | Oteen |
| Kornegay, Lemuel Weyher $^{24}$ | Rocky Mount |
| Kornegay, Robert Dumais, Or $^{24}$ | Rocky Mount |
| Kos, C. M., ALR $^{23}$ | Durham |
| Koseruba, George M., Pd $^{52}$ | Wilmington |
| Kossove, Albert Anthony, PN $^{48}$ | Charlotte |
| Kossove, Irene Levy, ObG $^{48}$ | Charlotte |
| Kress, Esta Joyce Levy, Pd $^{2}$ | Wadesboro |
| Kress, Jacob Himi, S $^{2}$ | Wadesboro |
| Kroncke, Fred George, I $^{32}$ | Roanoke Rapids |
| Lackey, Marvin Alphonso, OALR $^{31}$ | High Point |
| Lafferty, Robert Hervey (Hon.), R $^{48}$ | Charlotte |
| Lampley, Charles Gordon $^{66}$ | Rutherfordton |
| Lancaster, Newton Paris, GP $^{34}$ | Waynesville |
| Lane, Bessie Evans, I $^{74}$ | Raleigh |
| Lane, John Lofton (Hon.), OALR $^{24}$ | Rocky Mount |
| Lang, A. M., GP $^{9}$ | Morganton |
| Lanier, Verne Clifton, GP $^{21}$ | Welcome |
| *Lapsley, Alberti Fraser, GP $^{69}$ | Badin |
| Large, Hiram Lee, U $^{24}$ | Rocky Mount |
| Larkin, Ernest Waddill, OALR $^{5}$ | Washington |
| Lassiter, Vernon Clark, S $^{25}$ | Winston-Salem |
| Lassiter, Will Hardee, Jr., GP $^{40}$ | Selma |
| Laton, James Franklin (Hon.), OALR $^{69}$ | Albemarle |
| Lattimore, Everett Beam (Hon.), GP $^{17}$ | Shelby |
| *Lawrence, Benjamin Jones, S $^{74}$ | Raleigh |
| Lawson, George Williams, GP $^{1}$ | Graham |
| Lawson, Robert Barrett, Pd $^{25}$ | Winston-Salem |
| Leath, MacLean Bacon, OALR $^{31}$ | High Point |
| LeBauer, Maurice Leon, S $^{31}$ | Greensboro |
| LeBauer, Sidney Ferring, I $^{31}$ | Greensboro |
| *Lee, J. Marshall, GP $^{67}$ | Newton Grove |
| *Lee, Mike, U $^{42}$ | Kinston |
| *Lee, Thomas Leslie, ObG $^{42}$ | Kinston |
| Leinbach, Robert Frederic (Hon.), I $^{48}$ | Charlotte |
| *Lennon, Hershel Clanton, Path $^{31}$ | Greensboro |
| Leonard, Jacob Calvin, Jr., OALR $^{20}$ | Lexington |
| Leonard, Ruth, Oph $^{48}$ | Charlotte |
| *Levy, E. D., T $^{37}$ | Raeford |
| Lewis, Clifford Whitfield $^{12}$ | Beaufort |
| Lewis, John Sumter, S $^{13}$ | Hickory |
| Lewis, Robert Edward, S $^{77}$ | North Wilkesboro |
| *Lewis, Sigma Van $^{6}$ | Windsor |
| Lewis, Walter Glenn, GP $^{31}$ | Gibsonville |
| Liles, Lonnie Carl, GP $^{74}$ | Raleigh |
| Lilly, James Marshall (Hon.), OALR $^{20}$ | Fayetteville |
| Lindberg, Oliver Spurgeon, GP $^{8}$ | Asheville |
| Lindsay, Bert G., Jr., GP $^{25}$ | Walnut Cove |
| Lineberry, John Alson, PH $^{64}$ | Mayodan |
| Lister, John L. (Hon.), U $^{53}$ | Jackson |
| Little, Howard L., GP $^{31}$ | Gibsonville |
| Little, J. R., OALR $^{65}$ | Salisbury |
| Little, Lonnie Marcus, GP $^{38}$ | Statesville |
| *Livingston, Everett Alexander (Hon.), GP $^{68}$ | Gibson |
| Llewellyn, John Thomas, I $^{46}$ | Williamston |
| Lock, Frank Ray, ObG $^{25}$ | Winston-Salem |
| Logan, Frank William Hicks $^{66}$ | Rutherfordton |
| Lohr, Dermot, GP $^{21}$ | Lexington |
| *London, Arthur Hill, Jr., Pd $^{23}$ | Durham |
| Long, Frederick Yount (Hon.), GP $^{13}$ | Catawba |
| Long, Glenn (Hon.), GP $^{13}$ | Newton |
| Long, Ira Clinton, PN $^{76}$ | Goldsboro |
| Long, Lester Lee, GP $^{3}$ | West Jefferson |
| Long, Thomas Walter, GP $^{13}$ | Newton |
| Long, Vann McKee (Hon.), U $^{25}$ | Winston-Salem |
| *Long, William Matthews, S $^{65}$ | Mocksville |
| Long, Zachary Fillmore, Pd $^{62}$ | Rockingham |
| Looney, John Joseph Williams, OALR $^{24}$ | Rocky Mount |
| Lord, Margery Juline, PH $^{8}$ | Asheville |
| *Lore, Ralph Eli, S $^{11}$ | Lenoir |
| Lott, William Clifton, U $^{8}$ | Asheville |
| Lounsbury, James Breckinridge, ObG $^{52}$ | Wilmington |
| Love, William Marshall, GP $^{72}$ | Monroe |
| Lovelace, Daniel D., A $^{31}$ | Greensboro |
| Lovelace, Thomas Claude, GP $^{66}$ | Henrietta |
| Lovill, Robert Jones (Hon.), GP $^{70}$ | Mt. Airy |
| *Lowery, John Robert (Hon.) $^{65}$ | Salisbury |
| Lubchenko, Nicholas E. (Hon.), GP $^{10}$ | Harrisburg |
| Lupton, Emmett Stevenson, Pd $^{1}$ | Graham |
| Lutterloh, Isaac Hayden, Jr., GP&S $^{41}$ | Sanford |
| Lyda, Edgar W., GP $^{8}$ | Asheville |
| Lyday, Charles Emmett (Hon.), GP $^{27}$ | Gastonia |
| *Lyday, Russell Osborne, S $^{31}$ | Greensboro |
| Lyman, Richard Sherman, P $^{23}$ | Durham |
| Lynch, James Madison (Hon.), S $^{8}$ | Asheville |
| *Lynn, Cy Kellie, GP $^{9}$ | Valdese |
| Lyon, Brockton Reynolds, GP $^{31}$ | Greensboro |
| MacBrayer, Lewis Burgin, III, Pd $^{23}$ | Mooresville |
| MacConnell, John Wilson (Hon.), OALR $^{48}$ | Davidson |
| MacDonald, J. Kingsley, ObG $^{48}$ | Charlotte |

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*Present at 1947 meeting.

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| MacFadyen, Paul Rutherford, GP $^{10}$ | Concord |
| Mackie, George Carlyle, GP $^{74}$ | Wake Forest |
| *Mackie, Thomas T., I $^{25}$ | Winston-Salem |
| MacLauchlin, W. T., GP $^{13}$ | Conover |
| MacMillan, Elbert Alexander, PN $^{25}$ | Winston-Salem |
| *MacNider, William deBerniere (Hon.), Phar $^{23}$ | Chapel Hill |
| *Macon, Gideon Hunt, GP $^{75}$ | Warrenton |
| MacRae, John Donald, R $^{8}$ | Asheville |
| Maddrey, Milner Crocker, S $^{32}$ | Roanoke Rapids |
| Mahoney, J. W., ObG $^{8}$ | West Asheville |
| Major, R. T., ALR $^{35}$ | Hendersonville |
| *Maness, Archibald Kelly, Ob $^{31}$ | Greensboro |
| *Mann, Edward M. $^{56}$ | Moyock |
| Mann, Ira Thurman (Hon.), GP $^{31}$ | High Point |
| Manning, Isaac Hall, Jr., I $^{23}$ | Durham |
| Markham, Blackwell, S $^{23}$ | Durham |
| Marlowe, William Anderson, GP $^{30}$ | Walstonburg |
| Marr, James T., R $^{25}$ | Winston-Salem |
| Marr, Myron Whitmore (Hon.), I $^{51}$ | Pinehurst |
| Marrow, Jane Gregory, ObG $^{24}$ | Rocky Mount |
| Marsh, Frank Baker, I $^{65}$ | Salisbury |
| Marshall, James Flournoy, S $^{25}$ | Winston-Salem |
| Martin, Benjamin Franklin, I $^{25}$ | Winston-Salem |
| Martin, Donald Stover, Pd $^{23}$ | Durham |
| Martin, James Alfred (Hon.), Pd $^{63}$ | Lumberton |
| Martin, John Floyd (Hon.), OALR $^{33}$ | Dunn |
| Martin, John Henry (Hon.), GP $^{24}$ | Red Oak |
| Martin, John R., GP $^{54}$ | Holly Ridge |
| Martin, Lester Poindexter, OALR $^{25}$ | Mocksville |
| Martin, Moir Saunders (Hon.), S $^{70}$ | Mt. Airy |
| Martin, Thomas Adrian, Oph $^{74}$ | Raleigh |
| Martin, William Francis, S $^{48}$ | Charlotte |
| Massey, Charles Caswell, Pr $^{48}$ | Charlotte |
| *Matheson, Joseph Gaddy, OALR $^{36}$ | Ahoskie |
| Matheson, Robert Arthur, GP $^{37}$ | Raeford |
| Mathews, Robert William, I $^{31}$ | Greensboro |
| *Mathiesen, Kenneth Marlin, GP $^{14}$ | Pittsboro |
| Matros, Nathaniel Hamilton, S $^{8}$ | Asheville |
| *Matthews, George P., GP $^{22}$ | Rose Hill |
| Matthews, Hugh Archie $^{34}$ | Canton |
| Matthews, Vann Marshall, Ob $^{48}$ | Charlotte |
| Matthews, Wallace Russell, Pd $^{8}$ | Asheville |
| Matthews, William Camp, I $^{48}$ | Charlotte |
| Matthews, William W. (Hon.), GP $^{64}$ | Leaksville |
| Maulden, Paul Ranzo, S $^{10}$ | Kannapolis |
| Mauzy, Charles Hampton, Jr., ObG $^{25}$ | Winston-Salem |
| Mayer, Walter Brem, D $^{48}$ | Charlotte |
| McAdams, Charles Rupert (Hon.), GP $^{27}$ | Belmont |
| McAlister, Jean Colvin, Pd $^{31}$ | Greensboro |
| *McAllister, Hugh Alexander, ObG $^{63}$ | Lumberton |
| McAnally, James McGehee, S $^{64}$ | Reidsville |
| McAnally, William Jefferson (Hon.), GP $^{31}$ | High Point |
| McBee, Paul Thomas, S $^{47}$ | Marion |
| McBride, M. H. (Hon.) $^{64}$ | Reidsville |
| McBryde, Angus Murdoch, Pd$^{23}$ | Durham |
| McCain, Walkup Kennard, GP $^{31}$ | High Point |
| McCain, William R. (Hon.), GP $^{31}$ | High Point |
| McCall, Alvin Clay (Hon.), OALR $^{8}$ | Asheville |
| McCall, R. E., Jr., ALR $^{48}$ | Charlotte |
| McCall, William Herbert, OALR $^{8}$ | Asheville |
| McCarty, Ralph L., S $^{48}$ | Charlotte |
| McChesney, William Wallace, Ob $^{27}$ | Gastonia |
| McClees, Edward Chadwick, GP $^{78}$ | Elm City |
| McClelland, Joseph O. (Hon.), GP $^{63}$ | Maxton |
| McConnell, Harvey Russell, S $^{27}$ | Gastonia |
| McCotter, St. Elmo (Hon.), Ob $^{55}$ | Bayboro |
| McCoy, Thomas Marshal (Hon.), GP $^{48}$ | Charlotte |
| McCracken, John Rufus (Hon.), OALR $^{34}$ | Waynesville |
| McCracken, Joseph Pickett, I $^{23}$ | Durham |
| McCracken, Marvin Howell, GP $^{8}$ | Asheville |
| McCuiston, Allen Masten (Hon.), Pr $^{76}$ | Mt. Olive |
| McCutchan, Frank, OALR $^{65}$ | Salisbury |
| McCutcheon, William Benson, S $^{23}$ | Durham |
| McDade, Brodie Banks, Ob $^{1}$ | Burlington |
| McDonald, Angus Morris, U $^{48}$ | Charlotte |
| McDonald, Lester Bowman, GP $^{35}$ | Hendersonville |
| McDonald, Robert Lacy, GP $^{21}$ | Thomasville |
| McDowell, Harold Clyde, Or $^{25}$ | Winston-Salem |
| McDowell, Roy Hendrix, PH $^{27}$ | Belmont |
| McDowell, William Kitchin, PH $^{24}$ | Rocky Mount |
| McEachern, Duncan Roland, GP $^{52}$ | Wilmington |
| McElroy, James Lawrence, GP $^{45}$ | Marshall |
| *McElwee, Ross Simonton (Hon.), R $^{38}$ | Statesville |
| McFadyen, Oscar Lee, Jr., I $^{20}$ | Fayetteville |
| McGee, Julian Murrill, GP $^{31}$ | Greensboro |
| McGee, Robert Louis, S $^{74}$ | Raleigh |
| *McGowan, Claudius, I $^{46}$ | Plymouth |
| McGowan, Joseph Francis, OALR $^{8}$ | Asheville |
| McGrath, Frank Bernard, Pd $^{63}$ | Lumberton |
| McGuffin, William Christian, GP $^{8}$ | Asheville |
| *McIntosh, Donald Munro (Hon.), S $^{47}$ | Old Fort |
| McIntosh, Donald Munro, Jr., GP $^{47}$ | Marion |
| McIntosh, William Rufus, GP $^{62}$ | Rockingham |
| McIntyre, Stephen, S $^{63}$ | Lumberton |
| McIver, Lynn (Hon.), GP $^{41}$ | Sanford |
| *McKay, Hamilton Witherspoon (Hon.), U $^{48}$ | Charlotte |
| McKay, Robert Witherspoon, U $^{48}$ | Charlotte |
| McKay, William Peter, OALR $^{20}$ | Fayetteville |
| McKee, John Sasser, Jr., P $^{9}$ | Morganton |
| McKee, Lewis Middleton, I $^{23}$ | Durham |
| McKenzie, Benjamin Whitehead, S $^{65}$ | Salisbury |
| McKenzie, Wayland Nash, PH $^{69}$ | Albemarle |
| *McKinnon, W. J. $^{2}$ | Wadesboro |
| McKnight, Roy Bowman, S $^{48}$ | Charlotte |
| McLain, John Edward Gorsuch, T $^{78}$ | Wilson |
| McLamb, George Thomas, GP $^{1}$ | Mebane |
| McLaughlin, Calvin Sturgis (Hon.), GP $^{48}$ | Charlotte |
| McLaughlin, Calvin Sturgis, Jr., GP $^{48}$ | Charlotte |
| McLean, Ewen Kenneth, Pd $^{48}$ | Charlotte |
| McLelland, William Davies, GP $^{38}$ | Mooresville |
| McLemore, George A. (Hon.), GP $^{40}$ | Smithfield |
| McLendon, Walter, GP $^{69}$ | Oakboro |
| McLeod, Alexander H. (Hon.), S $^{51}$ | Aberdeen |
| McLeod, John Purl Utley, U $^{72}$ | Marshville |
| McLeod, Junius Hazel, GP $^{20}$ | Fayetteville |
| *McLeod, Mary Margaret, Pd $^{41}$ | Sanford |
| McLeod, Neill Henry, Jr., GP $^{74}$ | Raleigh |
| McLeod, Vida Canaday, GP $^{51}$ | Southern Pines |
| McLeod, William Louis, GP $^{69}$ | Norwood |
| McMahon, Francis J., Pr $^{8}$ | Asheville |
| McManus, Hugh Forrest, Jr., GP $^{74}$ | Raleigh |
| McMillan, Robert Lindsay, C $^{25}$ | Winston-Salem |
| McMillan, Robert M., I $^{51}$ | Southern Pines |
| *McMillan, Roscoe Drake (Hon.), GP $^{63}$ | Red Springs |
| McNairy, Margaret Caroline, Ob $^{11}$ | Lenoir |
| McNeill, James Hubert, I $^{77}$ | North Wilkesboro |
| McPhail, Lorenzo Dow (Hon.), Pr $^{48}$ | Charlotte |
| McPheeters, Samuel Brown, PH $^{76}$ | Goldsboro |
| *McPherson, Charles Wade (Hon.), OALR $^{1}$ | Burlington |
| McPherson, Samuel Dace (Hon.), OALR $^{23}$ | Durham |
| McTyre, H. E., PH $^{25}$ | Winston-Salem |
| Meadows, J. H., OALR $^{78}$ | Wilson |
| Mears, George Augustus, S $^{8}$ | Asheville |
| Mebane, William Carter, Jr., S $^{52}$ | Wilmington |
| Medlin, La Rue M. $^{18}$ | Tabor City |
| Mees, Theodore H., I $^{63}$ | Lumberton |
| *Menefee, Elijah Eugene, Jr., I $^{23}$ | Durham |
| Menzies, Henry Charles (Hon.), GP $^{13}$ | Hickory |
| Menzies, Henry Harding, ObG $^{25}$ | Winston-Salem |
| Meriwether, Benjamin Morsell, S $^{8}$ | Asheville |
| Merritt, Jesse Fred, GP $^{31}$ | Greensboro |
| *Mewborn, John Moses, GP $^{59}$ | Farmville |
| *Meyers, Paul T., R $^{42}$ | Kinston |

* Present at 1947 meeting.

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|---|---|
| Miale, John B., Path $^{23}$ | Chapel Hill |
| Michal, Mary Barrows Harris, Pd $^{34}$ | Waynesville |
| Mickley, Jack, GP $^{18}$ | Tabor City |
| Miles, May Sallie (Hon.), GP $^{31}$ | Greensboro |
| Miles, Walter W., GP $^{77}$ | Purlear |
| *Milham, Claude Gilbert, T $^{62}$ | Hamlet |
| Millender, Charles White, S $^{8}$ | Asheville |
| Miller, Harry, GP $^{15}$ | Murphy |
| Miller, John Floyd, S $^{47}$ | Marion |
| Miller, Lloyd, GP $^{47}$ | Marion |
| Miller, Oscar Lee, Or $^{48}$ | Charlotte |
| Miller, Robert Bascom (Hon.), Pd $^{76}$ | Goldsboro |
| *Miller, Robert Carlyle $^{27}$ | Gastonia |
| Miller, Robert P., S $^{48}$ | Charlotte |
| *Miller, Warren Edwin, S $^{18}$ | Whiteville |
| Milliken, James Shepard (Hon.), GP $^{51}$ | Southern Pines |
| Mills, Charles Rose, Oph $^{31}$ | Greensboro |
| Mills, Hugh H. $^{66}$ | Forest City |
| Mills, James C. $^{77}$ | North Wilkesboro |
| Misenheimer, E. A., GP $^{10}$ | Concord |
| *Mitchell, George William (Hon.), GP $^{78}$ | Wilson |
| Mitchell, Gurney Talmage, GP $^{77}$ | Wilkesboro |
| Mitchell, Landis Patterson $^{66}$ | Spindale |
| Mitchell, Paul Hayne (Hon.), GP $^{36}$ | Ahoskie |
| Mitchell, Robert Hartwell $^{27}$ | Gastonia |
| Mitchell, Roy Colonel, I $^{70}$ | Mt. Airy |
| Mitchell, Thomas Brice, GP $^{17}$ | Shelby |
| Mitchener, James Samuel (Hon.), OALR $^{74}$ | Raleigh |
| Mock, Charles Glenn $^{65}$ | Salisbury |
| *Mock, Frank Lowe (Hon.), GP $^{21}$ | Lexington |
| Moffett, Alexander Stuart, S $^{4}$ | Banner Elk |
| Monk, Henry Lawrence (Hon.), $^{65}$ | Salisbury |
| *Monroe, Clement Rosenberg, S $^{51}$ | Pinehurst |
| Monroe, Daniel Geddie, T $^{20}$ | Fayetteville |
| Monroe, Lance Truman, ObG $^{10}$ | Kannapolis |
| Montgomery, John Christian, Anes $^{48}$ | Charlotte |
| Moore, Alexander Wylie (Hon.), S&G $^{48}$ | Charlotte |
| Moore, Donald Bain (Hon.), Ind $^{69}$ | Badin |
| Moore, D. Forrest, ObG $^{17}$ | Shelby |
| Moore, Davis Lee, GP $^{59}$ | Winterville |
| Moore, Ernest Victor, Pd $^{17}$ | Shelby |
| Moore, Henry Blanchard, G $^{1}$ | Burlington |
| *Moore, Julian Alison, S $^{8}$ | Asheville |
| *Moore, Kinchen Carl, PH $^{68}$ | Laurinburg |
| Moore, Laurie Walker $^{12}$ | Beaufort |
| Moore, Oren (Hon.), G $^{48}$ | Charlotte |
| *Moore, Robert Alexander (Hon.), Or $^{25}$ | Winston-Salem |
| Moore, Robert Ashe, Pd $^{48}$ | Charlotte |
| Moore, Roy Hardin, GP $^{34}$ | Canton |
| Moore, William Houston (Hon.), Ob $^{52}$ | Wilmington |
| Moorefield, Robert Hoyle $^{10}$ | Kannapolis |
| Mordecai, Alfred, PH $^{25}$ | Winston-Salem |
| *Morehead, Robert Page, Path $^{25}$ | Winston-Salem |
| Morey, Milton B., GP&S $^{12}$ | Morehead City |
| Morgan, Burnice Earl, GP $^{8}$ | Asheville |
| Morgan, Grady Alexander, I $^{8}$ | Asheville |
| Morgan, William Gardner, PH $^{23}$ | Chapel Hill |
| Moricle, Charles Hunter, S $^{64}$ | Reidsville |
| Morgenstern, Philip, T $^{8}$ | Black Mountain |
| Morris, John Watson, S $^{12}$ | Morehead City |
| Morris, Joseph A. (Hon.), GP $^{26}$ | Franklinton |
| Morris, Rae Henderson, S $^{10}$ | Concord |
| Morris, Thomas A., Jr., GP $^{62}$ | Hamlet |
| Morrison, James Rudy, GP $^{38}$ | Statesville |
| Morse, Seymour, $^{31}$ | High Point |
| Morton, L. Thomas, OALR $^{43}$ | Lincolnton |
| Moseley, Zebulon Vance (Hon.), PH $^{42}$ | Kinston |
| *Moss, George Oren, Ind $^{66}$ | Cliffside |
| Motley, Fred Elliot, ALR $^{48}$ | Charlotte |
| Mudgett, William Chase (Hon.), I $^{51}$ | Southern Pines |
| Mumford, A. M. $^{59}$ | Winterville |
| Munroe, Colin A., S $^{48}$ | Boston, Mass. |
| Munroe, Henry Stokes (Hon.), S $^{48}$ | Charlotte |

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| *Munroe, Henry Stokes, Jr., S $^{48}$ | Charlotte |
| Munt, Herbert Frederick (Hon.), Or $^{25}$ | Winston-Salem |
| *Murchison, David Reid, I $^{52}$ | Wilmington |
| *Murphy, Gibbons Westbrook, R $^{8}$ | Asheville |
| *Murrah, Thomas A., III, Hosp Res. $^{48}$ | Charlotte |
| Murray, Robert Lebby, GP $^{37}$ | Raeford |
| Myers, Dwight Loftin, GP $^{38}$ | Harmony |
| Myers, Holland Thomas $^{21}$ | Lexington |
| Nailling, Richard C., S $^{8}$ | Asheville |
| Nalle, Brodie Crump (Hon.), ObG $^{48}$ | Charlotte |
| Nalle, Brodie Crump, Jr., U $^{48}$ | Charlotte |
| *Nance, Charles Lee, GP $^{48}$ | Charlotte |
| Nance, James Edwin, OALR $^{10}$ | Kannapolis |
| Nanzetta, Leonard, GP $^{25}$ | Rural Hall |
| Nash, John Frederick (Hon.), GP $^{63}$ | St. Pauls |
| Naumoff, Philip, GP $^{48}$ | Charlotte |
| Neal, J. Walter, S $^{74}$ | Raleigh |
| Neal, Kemp Prather, S $^{74}$ | Raleigh |
| Neblett, Herbert Clarence, Oph $^{48}$ | Charlotte |
| Neese, Kenneth Earle, GP $^{72}$ | Monroe |
| Nelson, Robert J. (Hon.), PH $^{46}$ | Robersonville |
| Neville, Cecil Howell, GP $^{32}$ | Scotland Neck |
| Newcomb, Andrew Purefoy, Jr., GP $^{73}$ | Henderson |
| Newell, Hodge Albert (Hon.), OALR $^{73}$ | Henderson |
| Newell, Leon Burns (Hon.), GP $^{48}$ | Charlotte |
| Newland, Charles Logan, S $^{71}$ | Brevard |
| Newman, Glenn C., I $^{67}$ | Clinton |
| Newman, Harold Hastings (Hon.), S $^{65}$ | Salisbury |
| Newton, Howard Lowell, GP $^{48}$ | Charlotte |
| *Newton, William King, OALR $^{77}$ | North Wilkesboro |
| Nichols, Alvan Alexander (Hon.), GP $^{39}$ | Sylva |
| Nichols, Asbury S. (Hon.), GP $^{39}$ | Sylva |
| Nichols, Austin Flint (Hon.), GP $^{58}$ | Roxboro |
| Nichols, Rhodes Edmond, Jr., I $^{23}$ | Durham |
| Nichols, Thomas Rogers, I $^{9}$ | Morganton |
| Nicholson, Neill Graham, Sr., OALR $^{62}$ | Rockingham |
| Nicholson, Plummer A. (Hon.), Ob $^{5}$ | Washington |
| Nicholson, William McNeal, I $^{23}$ | Durham |
| Nisbet, Douglas Heath, I $^{48}$ | Charlotte |
| Noble, Robert Primrose (Hon.), R $^{74}$ | Raleigh |
| Noblin, Roy Lee, GP $^{29}$ | Oxford |
| *Noel, William Walter, S $^{73}$ | Henderson |
| Noell, Robert Holman, GP $^{24}$ | Rocky Mount |
| *Nolan, James Onslow, GP $^{10}$ | Kannapolis |
| Norburn, Charles Strickland, S $^{8}$ | Asheville |
| Norburn, Russell Lee, S $^{8}$ | Asheville |
| Norfleet, Charles Millner, Jr., U $^{25}$ | Winston-Salem |
| *Norfleet, Edgar Powell, Pd $^{6}$ | Roxobel |
| Norman, J. Standing, OALR $^{27}$ | Gastonia |
| Norment, William Blount, S $^{31}$ | Greensboro |
| Norris, Charles Bradley, I $^{48}$ | Charlotte |
| Norris, Francis Loran, GP $^{22}$ | Beulaville |
| Northington, James Montgomery (Hon.), I $^{48}$ | Charlotte |
| *Norton, John W. R., PH $^{23}$ | Chattanooga, Tenn. |
| Norwood, Ballard, Jr., PH $^{29}$ | Oxford |
| Nowell, James S., GP $^{26}$ | Franklinton |
| Nowlin, George Preston, S $^{48}$ | Charlotte |
| O'Briant, Albert Lee, GP $^{37}$ | Raeford |
| *Odom, Guy L., NS $^{23}$ | Durham |
| Odom, Robert Taft, S $^{25}$ | Winston-Salem |
| *Oehlbeck, Luther William, R $^{9}$ | Morganton |
| Offutt, Vernon Delmus, I $^{42}$ | Kinston |
| Ogburn, Herbert Hammond (Hon.), S $^{31}$ | Greensboro |
| Ogburn, Lundie Calvin, ObG $^{25}$ | Winston-Salem |
| Ohle, E. R., GP $^{49}$ | Celo |
| Oliver, Adlai Stevenson, ObG $^{74}$ | Raleigh |
| Oliver, Joseph Andrew, GP $^{65}$ | Rockwell |
| Oliver, Richard S., ObG $^{74}$ | Raleigh |
| *Oliver, R. K., T $^{37}$ | Sanatorium |
| O'Neill, James Francis, S $^{25}$ | Winston-Salem |
| Orgain, Edward Stewart, C $^{23}$ | Durham |
| Ormand, John William, ALR $^{72}$ | Monroe |

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* Present at 1947 meeting.

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| Orr, Charles Collins (Hon.), I $^{8}$ | Asheville |
| Orr, Porter B. (Hon.), GP $^{8}$ | Asheville |
| Osborne, Joseph Evans, S $^{71}$ | Rosman |
| *Outland, Robert Boone, GP $^{53}$ | Rich Square |
| Outlaw, Jackson Kent, OALR $^{69}$ | Albemarle |
| Owen, Charles Fletcher, Jr., S $^{34}$ | Canton |
| Owen, Duncan Shaw, I $^{20}$ | Fayetteville |
| Owen, John Fletcher, NP $^{74}$ | Raleigh |
| Owen, Margaret Lineberry, G $^{34}$ | Canton |
| Owen, Robert Harrison, S $^{34}$ | Canton |
| Owen, W. Boyd, GP $^{34}$ | Waynesville |
| *Owens, Francis Leroy, S $^{51}$ | Pinehurst |
| *Owens, Zack Doxey, S $^{56}$ | Elizabeth City |
| Ownbey, Arthur Dennis, GP $^{31}$ | Greensboro |
| *Pace, Karl Busbee, GP $^{59}$ | Greenville |
| Pace, Samuel Eugene, GP $^{64}$ | Leaksville |
| Padgett, Charles King, GP $^{17}$ | Shelby |
| Padgett, Philip Grover, Pd $^{17}$ | Kings Mountain |
| Page, William Gordon, S&GP $^{43}$ | Lincolnton |
| Painter, William Watson, S $^{38}$ | Mooresville |
| Palmer, Horace, GP $^{32}$ | Littleton |
| Palmer, Marion Cherigny (Hon.) $^{60}$ | Tryon |
| *Palmer, Yates Shuford, S $^{9}$ | Valdese |
| Papineau, Alban, T&GP $^{46}$ | Plymouth |
| Parker, George Farrar, S $^{8}$ | Asheville |
| *Parker, Herman Richard, GP $^{31}$ | Greensboro |
| Parker, James Jarvis, GP $^{56}$ | Elizabeth City |
| Parker, James Roy, OALR $^{63}$ | Lumberton |
| Parker, Oscar Lee, OALR $^{67}$ | Clinton |
| Parker, Paul Godwin (Hon.), GP $^{33}$ | Erwin |
| Parker, Shepherd Falkener, GP $^{17}$ | Shelby |
| Parker, Wade Thomas, S $^{20}$ | Fayetteville |
| Parks, Walter Beatty, Ind $^{27}$ | Gastonia |
| *Parks, William Craig, GP $^{31}$ | High Point |
| Parrette, Nettie Coffey, GP $^{15}$ | Robbinsville |
| Parrette, Richard Grenville, GP $^{15}$ | Robbinsville |
| Parrott, G. Fountain, I $^{42}$ | Kinston |
| Parrott, John Arendall, Ob $^{42}$ | Kinston |
| Parrott, William Thomas (Hon.), GP $^{42}$ | Kinston |
| Parsons, William Herbert, GP $^{62}$ | Ellerbe |
| Parsons, L. J., GP $^{63}$ | Lumberton |
| Parsons, W. S., U $^{74}$ | Mobile, Ala. |
| *Paschal, George W., Jr., S $^{74}$ | Raleigh |
| *Pate, Archibald Hanes $^{76}$ | Goldsboro |
| Pate, James Frank, GP $^{34}$ | Canton |
| Pate, James Gibson, GP $^{68}$ | Gibson |
| Patman, William Louis, S $^{14}$ | Siler City |
| *Patterson, F. M. Simmons, S $^{68}$ | Laurinburg |
| *Patterson, Fred Geer, I $^{23}$ | Chapel Hill |
| *Patterson, Fred Marion, U $^{31}$ | Greensboro |
| Patterson, Hubert C., S $^{23}$ | Durham |
| Patterson, Joseph Flanner (Hon.), S $^{19}$ | New Bern |
| Patterson, Joseph Halford, GP $^{41}$ | Broadway |
| Patterson, R. D. $^{61}$ | Liberty |
| Pay, Wilson Cyrus, GP&S $^{35}$ | Hendersonville |
| Payne, E. Louise, ObG $^{74}$ | Raleigh |
| *Payne, John Abb, III $^{28}$ | Sunbury |
| Peabody, Carroll A., GP $^{25}$ | Winston-Salem |
| *Peacock, Thomas Gerald, P $^{51}$ | Pinebluff |
| Pearse, Richard Lehmer, ObG $^{23}$ | Durham |
| Pearson, Hugh Oliver, GP $^{24}$ | Pinetops |
| Peasley, Elmus Day, Path $^{8}$ | Asheville |
| Peede, Alvin Wortham, GP $^{33}$ | Lillington |
| *Peele, James Clarendon $^{76}$ | Goldsboro |
| Peeler, Clarence N. (Hon.), ALR $^{48}$ | Charlotte |
| Peeler, John H. (Hon.), Ob $^{65}$ | Salisbury |
| *Peete, Charles Henry (Hon.), Ob $^{75}$ | Warrenton |
| Pegg, Fred Grant, PH $^{25}$ | Winston-Salem |
| Pendleton, Wilson, I $^{8}$ | Asheville |
| Pennington, Glenn Walton, ALR $^{48}$ | Charlotte |
| Perry, David Russell, I $^{23}$ | Durham |
| Perry, Ernest Monroe (Hon.), Oph $^{24}$ | Rocky Mount |
| Perry, Glenn Grey, GP $^{31}$ | High Point |
| Perry, Henry B., GP $^{3}$ | Boone |
| Perry, Henry Baker, Jr., GP $^{3}$ | Boone |
| Perryman, Olin C., GP $^{25}$ | Winston-Salem |
| Persons, Elbert Lapsley, I $^{23}$ | Durham |
| Peters, August Richard, Jr., Pd $^{5}$ | Washington |
| Peters, David B., S $^{8}$ | Asheville |
| Peters, William Anthony, S $^{56}$ | Elizabeth City |
| Peters, William Anthony, Jr. $^{56}$ | Elizabeth City |
| Peterson, Charles A. (Hon.), GP $^{49}$ | Spruce Pine |
| Petteway, George Henry (Hon.), GP $^{48}$ | Charlotte |
| Pettit, H. S., R $^{27}$ | Gastonia |
| *Pettus, William Henry, Jr., S $^{48}$ | Charlotte |
| Pfohl, Samuel Frederick (Hon.), GP $^{25}$ | Winston-Salem |
| *Phelps, John Mahlon, I $^{46}$ | Creswell |
| *Phifer, Edward W., S $^{9}$ | Morganton |
| Phillips, Charles Hoover (Hon.), GP $^{21}$ | Thomasville |
| Phillips, Ernest Nicholas, GP $^{77}$ | North Wilkesboro |
| Pickard, H. M., I $^{52}$ | Wilmington |
| Pickrell, Kenneth L., S $^{23}$ | Durham |
| Pigford, R. T., I $^{52}$ | Wilmington |
| Pine, Irving, T $^{8}$ | Oteen |
| Pipes, David McKowan, A $^{31}$ | Greensboro |
| Pishkoe, M. T., S $^{51}$ | Pinehurst |
| Pittman, Earl Eugene, I $^{46}$ | Oak City |
| *Pittman, Malory Alfred, Or $^{78}$ | Wilson |
| Pittman, Raymond Lupton (Hon.), S $^{20}$ | Fayetteville |
| Pittman, William Austin, OALR $^{20}$ | Fayetteville |
| *Pitts, William Reid, S $^{48}$ | Charlotte |
| Piver, William C., GP $^{5}$ | Washington |
| Pleasants, George D., GP $^{14}$ | Siler City |
| Plonk, George W. $^{15}$ | Murphy |
| Plummer, David Edwin, PH $^{21}$ | Thomasville |
| Plyler, Ralph Johnson, S $^{65}$ | Salisbury |
| Pollock, Raymond A. (Hon.), GP $^{19}$ | New Bern |
| Pool, Bennette Baucom, A $^{25}$ | Winston-Salem |
| Pool, Charles Glenn, Pd $^{25}$ | Winston-Salem |
| Poole, Marvin Bailey, $^{33}$ | Dunn |
| *Pott, W. H., ObG $^{59}$ | Greenville |
| Potter, E. Lindsay, Jr., GP $^{48}$ | Charlotte |
| Powell, Albert Henry, GP $^{23}$ | Durham |
| Powell, E. Charles, Jr. $^{76}$ | Goldsboro |
| Powell, C. J., GP $^{52}$ | Wilmington |
| Powell, Herman Sutton, GP $^{28}$ | Gastonia |
| Powell, Jesse Averette (Hon.) $^{16}$ | Edenton |
| Powell, William F., OALR $^{8}$ | Asheville |
| Powers, Frank Poydras, ALR $^{74}$ | Raleigh |
| Prather, F. G., GP $^{8}$ | Asheville |
| Prefontaine, J. Edouard, OALR $^{31}$ | Greensboro |
| Pressly, David, I&Pd $^{38}$ | Statesville |
| Pressly, James Lowry, GP $^{38}$ | Statesville |
| Preston, John Zenas, GP $^{60}$ | Tryon |
| Pritchard, George Littleton, GP $^{42}$ | Black Mountain |
| *Procter, Ivan Marriott (Hon.), ObG $^{74}$ | Raleigh |
| Profitt, Ray V., T $^{8}$ | Asheville |
| Prusa, Victor H., GP $^{4}$ | Banner Elk |
| Pugh, Charles Harrison (Hon.), GP $^{27}$ | Gastonia |
| Pulliam, Benjamin Eloth, GP $^{25}$ | Winston-Salem |
| Purdy, James Jarrett (Hon.), GP $^{55}$ | Oriental |
| Putney, Robert Hubbard, Sr., GP $^{78}$ | Elm City |
| Putney, Robert Hubbard, Jr., GP $^{78}$ | Elm City |
| Query, Richard Zimri, Jr., I $^{48}$ | Charlotte |
| Quickel, John Cephas, OALR $^{27}$ | Gastonia |
| Quincy, Fred Ben, Ob&Pd $^{49}$ | Williamson, W. Va. |
| Quinn, David E. $^{8}$ | Oteen |
| †Quinn, Robert Franklin, GP $^{22}$ | Magnolia |
| *Raby, James Grover (Hon.), Pd $^{24}$ | Tarboro |
| Raby, William Thomas, Asst. Hosp. Res. $^{24}$ | Baltimore, Md. |
| Rainey, William Thomas (Hon.), I $^{20}$ | Fayetteville |
| Ramsay, James Graham, S $^{5}$ | Washington |
| Ramsaur, Jackson Townsend, OALR $^{66}$ | Rutherfordton |
| Ramseur, William Lee, GP $^{17}$ | Kings Mountain |
| *Raney, Richard Beverly, Or $^{23}$ | Durham |
| Rankin, Pressly Robinson (Hon.), GP $^{50}$ | Mt. Gilead |

* Present at 1947 meeting.

† Deceased.

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| Rankin, R. B. $^{10}$ | Concord |
| Rankin, Samuel Wharton (Hon.), ALR $^{25}$ | Winston-Salem |
| Rankin, Watson Smith (Hon.), PH $^{48}$ | Charlotte |
| Ranson, John Lester, Sr., Anes $^{48}$ | Charlotte |
| Raper, J. S., R $^{8}$ | Asheville |
| *Ravenel, Samuel Fitzsimmons, Pd $^{31}$ | Greensboro |
| Ray, Frank Leonard, U $^{48}$ | Charlotte |
| Ray, John B. (Hon.), GP $^{64}$ | Leaksville |
| Ray, Ritz Clyde, GP $^{3}$ | West Jefferson |
| †Reaves, William Perry (Hon.), OALR $^{31}$ | Greensboro |
| *Reavis, Charles William $^{31}$ | Greensboro |
| Redding, John O., GP $^{61}$ | Asheboro |
| Redwine, James Daniel $^{21}$ | Lexington |
| Reece, John C., Path $^{9}$ | Morganton |
| Reeves, James Leroy, GP $^{20}$ | Hope Mills |
| Reeves, Jerome Lyda, GP $^{34}$ | Canton |
| Reeves, Riley Jefferson, GP $^{8}$ | Leicester |
| *Reeves, Robert James, R $^{23}$ | Durham |
| Register, John Francis, Or $^{31}$ | Greensboro |
| Reid, Calvin Graham, I $^{48}$ | Charlotte |
| *Reid, Charles H., Jr., I $^{25}$ | Winston-Salem |
| Reid, James William (Hon.), GP $^{27}$ | Lowell |
| Reid, Ralph Connor, S $^{48}$ | Charlotte |
| Reinhardt, James Franklin, I $^{43}$ | Lincolnton |
| Reitzel, Claude Everett (Hon.), GP $^{31}$ | High Point |
| *Reynolds, Carl Vernon (Hon.), PH $^{74}$ | Raleigh |
| Reynolds, Ernest Harold, GP $^{64}$ | Reidsville |
| Rhodes, James Slade (Hon.), I $^{46}$ | Williamston |
| Rhodes, James Slade, Jr., I $^{46}$ | Williamston |
| *Rhodes, John Sloan, U $^{74}$ | Raleigh |
| *Rhudy, Booker Ephram, R $^{31}$ | Greensboro |
| Rhyne, Robert Edgar (Hon.), PH $^{27}$ | Gastonia |
| Rhyne, Sam Albertus, GP $^{38}$ | Statesville |
| Richards, Charles E., U $^{23}$ | Durham |
| Richardson, Frank Howard, P $^{8}$ | Black Mountain |
| Richardson, J. J., S $^{68}$ | Laurinburg |
| *Richardson, William Perry, GP $^{23}$ | Chapel Hill |
| Ricks, Leonard E. (Hon.), GP $^{63}$ | Fairmont |
| †Riddle, Joseph Bennett (Hon.), GP $^{9}$ | Morganton |
| Ridge, Clyde Franklin $^{31}$ | High Point |
| Riggs, M. M., GP $^{9}$ | Drexel |
| Riggsbee, Arthur Eugene (Hon.), GP $^{23}$ | Durham |
| Riggsbee, John B., GP $^{23}$ | Chapel Hill |
| Riner, C. R., GP $^{31}$ | Greensboro |
| Ringer, Paul Henry (Hon.), T $^{8}$ | Asheville |
| Roberson, E. L., S $^{24}$ | Tarboro |
| Roberson, Foy (Hon.), S $^{23}$ | Durham |
| Roberson, Robert Stuart, GP$^{34}$ | Waynesville |
| Roberts, Bennett Watson, Pd $^{23}$ | Durham |
| Roberts, Bryan Nazer, GP $^{23}$ | Hillsboro |
| Roberts, Louis Carroll, U $^{23}$ | Durham |
| Roberts, William McKinley, Or $^{27}$ | Gastonia |
| *Robertson, Carroll Bracey $^{32}$ | Jackson |
| Robertson, Edwin Mason, S $^{23}$ | Durham |
| *Robertson, James Farish (Hon.), S $^{52}$ | Wilmington |
| Robertson, John Newton, OALR $^{20}$ | Fayetteville |
| Robertson, Leon W., GP $^{24}$ | Rocky Mount |
| Robertson, Lloyd Harvey $^{65}$ | Salisbury |
| Robinson, Charles Wilson, GP $^{48}$ | Charlotte |
| *Robinson, Donald Edward, Pd $^{1}$ | Burlington |
| Robinson, James Lee, S $^{27}$ | Gastonia |
| Robinson, John Daniel, GP $^{22}$ | Wallace |
| Robinson, William Ashby $^{47}$ | Old Fort |
| Robinson, W. J., GP $^{3}$ | Creston |
| Robinson, W. Locke, GP $^{45}$ | Mars Hill |
| Rodda, John S., GP $^{15}$ | Andrews |
| *Rodgers, William Daniel, GP $^{75}$ | Warrenton |
| Rodman, Clark, GP $^{5}$ | Washington |
| Rodman, Robert Boyd, I $^{52}$ | Wilmington |
| Rodwell, Eleanor, GP $^{23}$ | Durham |
| Rogers, Gaston Wilder, PH $^{23}$ | Chapel Hill |
| Rollins, Charles Dick $^{73}$ | Henderson |
| Rollins, Vance Benton $^{73}$ | Henderson |
| *Root, Aldert Smedes (Hon.), Pd $^{74}$ | Raleigh |
| Rose, Abraham Hewitt (Hon.), GP $^{40}$ | Smithfield |
| *Rose, David Jennings, S $^{76}$ | Goldsboro |
| *Rose, James William, GP $^{76}$ | Pikeville |
| Rosenbaum, Maurice Milton, S $^{52}$ | Shallotte |
| Ross, George Floyd, GP $^{45}$ | Hot Springs |
| *Ross, Otho Bescent (Hon.), R $^{48}$ | Charlotte |
| Ross, Robert Alexander, ObG $^{23}$ | Durham |
| Ross, Thomas Wallace, GP $^{48}$ | Charlotte |
| Rosser, Robert Guthrie (Hon.), GP $^{51}$ | Vass |
| Rosser, Robert Guthrie, Jr., I $^{23}$ | Durham |
| *Rousseau, James Parks, R $^{25}$ | Winston-Salem |
| Rowe, George C., GP $^{47}$ | Marion |
| Rowe, Virginia Copeland, GP $^{47}$ | Marion |
| *Royal, Benjamin F. (Hon.), S $^{12}$ | Morehead City |
| Royal, Donnie Martin, GP $^{67}$ | Salemburg |
| Royall, M. A. (Hon.), OALR $^{70}$ | Elkin |
| Royster, Chauncey Lake, GP $^{74}$ | Raleigh |
| Royster, Hubert Ashley (Hon.), S $^{74}$ | Raleigh |
| Royster, J. D., GP $^{40}$ | Benson |
| Royster, Stephen Sampson (Hon.), GP $^{17}$ | Shelby |
| Royster, Thomas Hays (Hon.), OALR $^{24}$ | Tarboro |
| Ruark, Robert James, ObG $^{74}$ | Raleigh |
| Rubin, Adrian Stevens, Pd $^{31}$ | Greensboro |
| Rucer, A. W., GP $^{64}$ | Spray |
| Rucker, Adin Adam (Hon.), GP $^{66}$ | Rutherfordton |
| *Ruffin, David Winston, GP $^{42}$ | Pink Hill |
| *Ruffin, Jennings Bryan $^{36}$ | Ahoskie |
| *Ruffin, Julian Meade, I $^{23}$ | Durham |
| Rundles, R. Wayne, I $^{23}$ | Durham |
| Russell, Charles R., GP $^{11}$ | Granite Falls |
| Russell, Jesse Milton (Hon.), Pd $^{34}$ | Canton |
| Russell, Lloyd Pacemas, GP $^{35}$ | Fletcher |
| Russell, William Marler, OALR $^{8}$ | Asheville |
| Sabiston, Frank, OALR $^{42}$ | Kinston |
| Sader, Julius, GP $^{71}$ | Brevard |
| Sadler, Ralph Calvert (Hon.), GP $^{18}$ | Whiteville |
| Salle, George F., GP $^{5}$ | Washington |
| Salley, Edward McQueen (Hon.), ObG $^{35}$ | Hendersonville |
| Salmons, Henry Clay (Hon.), GP $^{70}$ | Elkin |
| Salter, Theodore, GP $^{12}$ | Beaufort |
| Salters, Frederic Hay, OALR $^{56}$ | Elizabeth City |
| Sample, Robert Cannon, GP $^{35}$ | Hendersonville |
| Sams, William Albert, GP $^{45}$ | Marshall |
| Sanders, L. H., Pd $^{74}$ | Raleigh |
| Sanger, W. Paul, S $^{48}$ | Charlotte |
| Saunders, John Turner, Or $^{8}$ | Asheville |
| *Saunders, Sheldon Asa, GP $^{6}$ | Aulander |
| *Saunders, Stanley Stewart, Pd $^{31}$ | High Point |
| Schaffle, Karl, I $^{8}$ | Asheville |
| Schallert, Paul Otto (Hon.), GP $^{25}$ | Orlando, Fla. |
| Schenk, Sam Moore, S $^{17}$ | Shelby |
| *Schiebel, Herman Max, S $^{23}$ | Durham |
| Schoenheit, Edward William, I $^{8}$ | Asheville |
| Scott, Allan F. $^{65}$ | Salisbury |
| Scott, Samuel Floyd, GP $^{1}$ | Burlington |
| Scruggs, William Henry, GP $^{15}$ | Andrews |
| Scruggs, William Marvin, S $^{48}$ | Charlotte |
| Sealey, Will C., S $^{23}$ | Durham |
| *Seay, Hillis Ledbetter, T $^{48}$ | Huntersville |
| *Seay, Thomas Waller, GP $^{65}$ | Spencer |
| Selby, William Elledge, NP $^{48}$ | Charlotte |
| Selman, Joseph, R $^{25}$ | Winston-Salem |
| Sensenbach, Charles Willis, I $^{31}$ | High Point |
| Sessoms, Edwin Tate (Hon.), GP $^{67}$ | Roseboro |
| Severn, Henry D., Or $^{8}$ | Asheville |
| Sevier, Joseph Thomas (Hon.), GP $^{8}$ | Asheville |
| *Shafer, Irving Everett (Hon.), Ob $^{65}$ | Salisbury |
| Sharp, Oliver Ledbetter, I $^{31}$ | Greensboro |
| Sharpe, Charles Ray (Hon.), OALR $^{21}$ | Lexington |
| *Sharpe, Frank Alexander, ObG $^{31}$ | Greensboro |
| Shaver, William Trantham, S $^{69}$ | Albemarle |
| Shaw, John Alexander, Pd $^{20}$ | Fayetteville |
| Shaw, Lloyd Roosevelt, GP $^{38}$ | Statesville |

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* Present at 1947 meeting.

† Deceased.

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|---|---|
| Shelburne, Palmer Augustine, I $^{31}$ | Greensboro |
| Shepard, Karl $^{31}$ | High Point |
| Sherrill, Herbert Rankin, GP $^{17}$ | Shelby |
| Sherrill, Phil Minnis, GP $^{21}$ | Thomasville |
| Shinn, G. C. $^{65}$ | China Grove |
| Shohan, Joseph, R $^{31}$ | Greensboro |
| Shuford, Jacob Harrison, GP $^{13}$ | Hickory |
| Shuford, Mary Frances, Path $^{8}$ | Asheville |
| Shuler, Edward L. $^{8}$ | Asheville |
| Shuler, James Edward, GP $^{23}$ | Durham |
| Shull, Joseph Rush (Hon.), R $^{48}$ | Charlotte |
| *Sidbury, James Buren (Hon.), Pd $^{52}$ | Wilmington |
| Sikes, Charles Henry, GP $^{31}$ | Greensboro |
| Sikes, Gibson L. (Hon.), GP $^{67}$ | Salemburg |
| Simmons, Alexander Wingate, GP $^{1}$ | Burlington |
| Simons, Claude Ernest, I $^{78}$ | Wilson |
| *Simpson, Henry Hardy, GP $^{1}$ | Elon |
| *Sinclair, Lewis Gordon, S $^{74}$ | Raleigh |
| Sinclair, Roby Thomas, Jr., GP $^{52}$ | Wilmington |
| Singletary, George Currie, GP $^{7}$ | Clarkton |
| Sink, Charles Shelton, GP $^{77}$ | North Wilkesboro |
| Sisk, Crete Nixon, PH $^{9}$ | Morganton |
| Siske, Grady Cornell, GP $^{31}$ | Pleasant Garden |
| Skeen, Leo Brown, GP $^{38}$ | Mooresville |
| Skinner, Benjamin S., Pd $^{23}$ | Durham |
| Slagle, T. D., GP&S $^{39}$ | Sylva |
| Slate, John Samuel (Hon.), GP $^{25}$ | Winston-Salem |
| Slate, John William, GP $^{31}$ | High Point |
| *Slate, Joseph Esmond, GP $^{31}$ | High Point |
| Slate, Marvin Longworth, GP $^{31}$ | High Point |
| Sloan, Allen Barry, GP $^{38}$ | Mooresville |
| Sloan, David Bryan, OALR $^{52}$ | Wilmington |
| Sloan, Henry Lee, Oph $^{48}$ | Charlotte |
| Sloan, William Henry, GP $^{67}$ | Garland |
| Sloop, Eustace H. (Hon.), GP $^{4}$ | Crossnore |
| Sluder, Fletcher S., ObG $^{8}$ | Asheville |
| Small, Victor Roy, GP $^{67}$ | Clinton |
| Smart, Gardner F., OALR $^{8}$ | Asheville |
| Smerznak, John Joseph, GP $^{10}$ | Concord |
| Smethie, William, S $^{23}$ | Rocky Mount |
| Smith, Alick Thomas (Hon.), GP $^{31}$ | Greensboro |
| Smith, Anderson Jones, GP $^{78}$ | Black Creek |
| Smith, Annie Thompson, GP $^{23}$ | Durham |
| Smith, Bernard Reid (Hon.), I $^{8}$ | Asheville |
| *Smith, Claiborne Thweat, I $^{24}$ | Rocky Mount |
| Smith, David Tillerson, I $^{23}$ | Durham |
| Smith, Edward Barney, GP $^{32}$ | Enfield |
| Smith, Erma A., I $^{23}$ | Durham |
| *Smith, Fitzhugh Lee, GP $^{1}$ | Burlington |
| Smith, Foyle P., ObG $^{21}$ | Lexington |
| Smith, Franklin Calton, Oph $^{48}$ | Charlotte |
| Smith, George Marvin, GP $^{72}$ | Monroe |
| *Smith, Gordon, GP $^{24}$ | Rocky Mount |
| Smith, Harold Benjamin, G $^{77}$ | North Wilkesboro |
| Smith, Jay L., GP $^{65}$ | Spencer |
| Smith, J. Alexander (Hon.), S $^{21}$ | Lexington |
| Smith, John Goodrich, I $^{24}$ | Rocky Mount |
| Smith, J. H., Path $^{52}$ | Wilmington |
| Smith, John McNeill (Hon.), GP $^{63}$ | Rowland |
| Smith, Joseph, ObG $^{59}$ | Greenville |
| *Smith, Joseph Elmer, GP $^{6}$ | Windsor |
| Smith, Melvin Bowman, GP $^{61}$ | Ramseur |
| Smith, Opie Norris, I $^{31}$ | Greensboro |
| Smith, Oscar Fennell (Hon.), GP $^{32}$ | Scotland Neck |
| Smith, Randall Collins $^{59}$ | Ayden |
| Smith, Robert Edwin $^{70}$ | Mt. Airy |
| Smith, Roy Meadows, Pd $^{31}$ | Greensboro |
| Smith, Ruby A., I $^{23}$ | Chapel Hill |
| Smith, Sidney S., Jr., U $^{74}$ | Raleigh |
| Smith, Slade Alvah, OALR $^{18}$ | Whiteville |
| Smith, William Carey, GP $^{76}$ | Goldsboro |
| Smith, William Franklin (Hon.), GP $^{18}$ | Chadbourn |
| Smith, William Gordon, S $^{21}$ | Thomasville |
| Smoot, James Edward (Hon.), GP $^{10}$ | Concord |
| *Snipes, Richard Dean, Ob $^{20}$ | Fayetteville |
| *Soady, John Hostley, Pd $^{61}$ | Asheboro |
| Sorrell, Furman Yates, GP $^{2}$ | Wadesboro |
| Souther, W. E., GP $^{35}$ | Hendersonville |
| *Southerland, Robert William, PN $^{48}$ | Charlotte |
| Sowers, Roy Gerodd, OALR $^{41}$ | Sanford |
| Sox, Carl Caughman, GP $^{40}$ | Kenly |
| Spainhour, Ellis H. (Hon.), GP $^{25}$ | Winston-Salem |
| Sparrow, Harry Ward $^{31}$ | Greensboro |
| Sparrow, Thomas DeLamar, S $^{48}$ | Charlotte |
| Speas, Dallas C., GP $^{25}$ | Winston-Salem |
| Speas, William Paul (Hon.), Oph $^{25}$ | Winston-Salem |
| Speas, William Paul, Jr., GP $^{23}$ | Durham |
| Speed, Joseph Anderson (Hon.), GP$^{23}$ | Durham |
| Speight, James Ambler (Hon.), GP $^{24}$ | Rocky Mount |
| Spencer, Frederick Brunell (Hon.) $^{65}$ | Salisbury |
| Spicer, Richard Williams (Hon.), Ob $^{25}$ | Winston-Salem |
| Spiggle, Charles Harold, GP $^{59}$ | Grimesland |
| Spikes, Normen Owen, GP $^{23}$ | Durham |
| Spoon, Samuel Clarence, ObG $^{1}$ | Burlington |
| Sprinkle, Charles Nichols, GP $^{8}$ | Weaverville |
| *Sprunt, William Hutchinson, Jr., S $^{25}$ | Winston-Salem |
| Squires, Claude Babbington, U $^{48}$ | Charlotte |
| Stainback, William C., S&ObG $^{74}$ | Camp Lejeune |
| Stanfield, William Wesley, S $^{33}$ | Dunn |
| Stanford, Lois Foote, I $^{23}$ | Durham |
| Stanford, William Raney, I $^{23}$ | Durham |
| Stanley, John Haywood (Hon.), GP $^{40}$ | Four Oaks |
| Stanton, T. M. (Hon.) $^{31}$ | High Point |
| *Starling, Howard Montfort, S $^{25}$ | Winston-Salem |
| Starling, Wyman Plato, R $^{67}$ | Roseboro |
| Starr, Henry Frank (Hon.), Ins $^{31}$ | Greensboro |
| Staton, Leon Raphael, GP $^{15}$ | Haysville |
| *Stead, Eugene A., Jr., I $^{23}$ | Durham |
| Steiger, Howard P., D $^{48}$ | Charlotte |
| Stelling, Richard Nunnally, GP $^{31}$ | Greensboro |
| Stephenson, Bennett Edward, GP $^{53}$ | Rich Square |
| Stevens, Alexander H., Jr., OALR $^{19}$ | New Bern |
| Stevens, Anna O., Student Health $^{31}$ | Greensboro |
| Stevens, Hamilton Wright, Jr., PH $^{78}$ | Graham |
| Stevens, Joseph Blackburn, N&I $^{31}$ | Greensboro |
| Stevick, Charles Paul, PH $^{74}$ | Raleigh |
| Stewart, Daniel Niven, Jr., GP $^{13}$ | Hickory |
| Stiff, A. Olin, GP $^{9}$ | Valdese |
| Stimpson, Robert Tula, GP $^{25}$ | Winston-Salem |
| Stirewalt, Neale Summers, GP $^{31}$ | High Point |
| Stocker, Frederick W., Oph $^{23}$ | Durham |
| Stone, Marvin Lee, GP $^{24}$ | Rocky Mount |
| Stone, John S., GP $^{64}$ | Leaksville |
| Straughan, John William $^{22}$ | Warsaw |
| *Street, Claudius Augustus, Pd $^{25}$ | Winston-Salem |
| Street, Murdo Eugene, Jr. $^{51}$ | Glendon |
| Stretcher, Robert Hatfield, S $^{34}$ | Waynesville |
| Stricker, Robert L., Anes&GP $^{8}$ | Asheville |
| Strickland, Arthur Thomas, Ob $^{78}$ | Wilson |
| Strickland, Edward F. (Hon.), GP $^{25}$ | Winston-Salem |
| Strickland, Ernest Lee (Hon.), Pd $^{78}$ | Wilson |
| Strickland, Horace Gilmore, OALR $^{31}$ | Greensboro |
| Stringfield, Samuel Lanier (Hon.), S $^{34}$ | Waynesville |
| Stringfield, Thomas, GP $^{34}$ | Waynesville |
| Stringfield, Thomas, Sr. (Hon.), Anes $^{34}$ | Waynesville |
| Stroupe, Albertus Ula, Jr. $^{27}$ | Mt. Holly |
| *Strosnider, Charles Franklin (Hon.), I $^{76}$ | Goldsboro |
| Stuck, P. L., GP $^{52}$ | Wilmington |
| Stuckey, Charles L., I $^{48}$ | Charlotte |
| Stutz, M. G., Ob&Pd $^{20}$ | Fayetteville |
| *Styron, Charles W., I $^{74}$ | Raleigh |
| Suiter, Wester Ghio, GP $^{32}$ | Weldon |
| *Suitt, Robert Burke, NP $^{8}$ | Durham |
| Sullivan, Joseph Timothy, GP $^{8}$ | Asheville |

* Present at 1947 meeting.

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| Summerlin, Harry, GP $^{68}$ | Laurinburg |
| Summers, J. Dent, S $^{13}$ | Hickory |
| *Summerville, Walter Monroe, CP $^{48}$ | Charlotte |
| Sumner, Emmett Ashworth, S $^{31}$ | High Point |
| Sumner, George Herbert, PH $^{61}$ | Asheboro |
| Sumner, Thomas W., GP $^{35}$ | Hendersonville |
| Swann, Cecil Collins, ALR $^{8}$ | Asheville |
| Swann, Joseph Fuller (Hon.), GP $^{10}$ | Kannapolis |
| Sweaney, Hunter McGuire, S $^{23}$ | Durham |
| Swindell, Lewis Holmes, GP&S $^{5}$ | Washington |
| Swisher, Otto J., Jr., PH $^{74}$ | Raleigh |
| *Sykes, Charlie Louis, GP $^{70}$ | Pilot Mountain |
| Sykes, Joy Verle, GP $^{24}$ | Rocky Mount |
| Sykes, Ralph Judson, PH $^{70}$ | Mt. Airy |
| Sykes, Rufus Preston, S $^{61}$ | Asheboro |
| Symington, John, PH $^{51}$ | Carthage |
| Tally, Bailey Thomas, S $^{69}$ | Albemarle |
| Tankersley, James William (Hon.), S $^{31}$ | Greensboro |
| Tannenbaum, Abraham Jack, I $^{31}$ | Greensboro |
| Tart, Baston Isaiah, Jr. $^{76}$ | Goldsboro |
| Tashiro, Sabro, T $^{78}$ | Wilson |
| Tate, William Cummings (Hon.), S $^{4}$ | Banner Elk |
| Tatum, Roy Carroll $^{38}$ | Taylorsville |
| *Tayloe, John Cotten, Ob $^{5}$ | Washington |
| Taylor, Andrew Duval, A $^{48}$ | Charlotte |
| Taylor, Benjamin Cicero, GP $^{27}$ | Mt. Holly |
| Taylor, Erasmus Hervey Evans, P $^{9}$ | Morganton |
| Taylor, Frank Victor, OALR $^{15}$ | Murphy |
| Taylor, Frederick Raymond (Hon.), I $^{31}$ | High Point |
| Taylor, George Winston (Hon.), S $^{38}$ | Mooresville |
| Taylor, James Nathaniel (Hon.), I $^{31}$ | Greensboro |
| Taylor, John Eldredge, GP $^{9}$ | Morganton |
| Taylor, Rives Williams, GP $^{29}$ | Oxford |
| Taylor, Shahane Richardson, OALR $^{31}$ | Greensboro |
| Taylor, Thomas Jefferson $^{32}$ | Roanoke Rapids |
| Taylor, Vernon Williams, Jr. $^{70}$ | Elkin |
| Taylor, Wesley Ewing, PN $^{31}$ | Greensboro |
| Taylor, William Ivey (Hon.), GP $^{52}$ | Burgaw |
| Taylor, William Ivey, Jr., GP $^{52}$ | Burgaw |
| Taylor, William Louis (Hon.), GP $^{29}$ | Oxford |
| Teasdale, Laurie Redmond, Or $^{48}$ | Charlotte |
| *Temple, Rufus Henry, I $^{42}$ | Kinston |
| †Templeton, John Young, GP $^{38}$ | Mooresville |
| *Templeton, Ralph $^{11}$ | Lenoir |
| Tennent, Gaillard S. (Hon.), Oph $^{8}$ | Asheville |
| Terry, Jarvis Russell (Hon.), Pd $^{21}$ | Lexington |
| Terry, Philip Roy, GP $^{8}$ | Asheville |
| Terry, William Calvin (Hon.), GP $^{62}$ | Hamlet |
| Thaxton, Benjamin Adams (Hon.), GP $^{58}$ | Roxboro |
| Thigpen, Harry Gordon, GP $^{32}$ | Scotland Neck |
| Thomas, B. D., GP $^{74}$ | Zebulon |
| *Thomas, Charles Darwin, T $^{8}$ | Black Mountain |
| *Thomas, Walter Lee, ObG $^{23}$ | Durham |
| Thomas, Wilbur Clyde, Path $^{25}$ | Winston-Salem |
| Thomas, William Nelson (Hon.), S $^{29}$ | Oxford |
| Thompson, Claude Durant (Hon.), GP $^{31}$ | High Point |
| Thompson, Clive Allen, GP $^{77}$ | Sparta |
| *Thompson, George Richard Cunliffe, GP $^{52}$ | Wilmington |
| *Thompson, Heyward Chevis, T $^{17}$ | Shelby |
| *Thompson, Hugh Alexander (Hon.), Or $^{74}$ | Raleigh |
| Thompson, Joseph W. (Hon.), GP $^{29}$ | Creedmoor |
| *Thompson, Lloyd J., P $^{25}$ | Winston-Salem |
| Thompson, Sanford Webb, Jr., GP $^{12}$ | Morehead City |
| Thompson, Silas Raymond (Hon.), U $^{48}$ | Charlotte |
| *Thompson, William Nelson, Hosp Res. $^{74}$ | Raleigh |
| Thompson, Winfield L., S&G $^{76}$ | Goldsboro |
| Thornhill, Edwin Hale $^{74}$ | Raleigh |
| Thorp, Adam Tredwell, ObG $^{24}$ | Rocky Mount |
| Thurston, Asa (Hon.), GP $^{38}$ | Taylorsville |
| Tice, Walter Thomas, GP $^{31}$ | High Point |
| Tillery, Jack Gregory, GP $^{78}$ | Wilson |
| Tilt, LeRoy W., Jr., GP $^{17}$ | Lawndale |
| Todd, Lester Claire, CP $^{48}$ | Charlotte |
| Townsend, Maurice Lyndon (Hon.), $^{48}$ | Society Hill, S. C. |
| Townsend, Robert Glenn, GP $^{63}$ | St. Pauls |
| *Trent, Josiah Charles, S $^{23}$ | Durham |
| Trachtenberg, William, GP $^{76}$ | Goldsboro |
| Triplett, William Romulus, GP $^{77}$ | Purlear |
| Trotter, Fred Oscar, S $^{35}$ | Hendersonville |
| Troutman, Baxter Suttles, GP $^{11}$ | Lenoir |
| Troxler, Raymond Moody (Hon.), GP $^{1}$ | Burlington |
| *Tucker, Earl Van, GP $^{59}$ | Grifton |
| *Tuggle, Allan Davis, R $^{48}$ | Charlotte |
| Turlington, William Troy, Jr., GP $^{54}$ | Jacksonville |
| Turner, Henry Gray, S $^{74}$ | Raleigh |
| Turrentine, Kilby Pairo, I $^{42}$ | Kinston |
| Turner, Larry, OALR $^{23}$ | Durham |
| Turner, Violet H., ObG $^{23}$ | Durham |
| Tuttle, Andrew Frier (Hon.), GP $^{64}$ | Spray |
| Tuttle, Marler Slate, Pd $^{10}$ | Kannapolis |
| Tuttle, Reuben Grey (Hon.), GP $^{25}$ | Winston-Salem |
| Tydeman, Frederick William Louis, CP $^{48}$ | San Francisco, Calif. |
| Tyler, Earl Runyon, D $^{23}$ | Durham |
| Tyndall, Robert Glenn, S $^{42}$ | Kinston |
| *Tyner, Carl Vann, S $^{64}$ | Leaksville |
| Tyson, John Joyner $^{59}$ | Des Moines, Iowa |
| Tyson, Thomas David (Hon.), Pr $^{1}$ | Mebane |
| Tyson, Thomas David, Jr., Pd $^{31}$ | High Point |
| *Tyson, Woodrow Wilson, I $^{31}$ | High Point |
| Ulloth, Gustave, GP $^{35}$ | Hendersonville |
| *Umphlet, Thomas Leonard, I $^{74}$ | Raleigh |
| Upchurch, Robert T. (Hon.) $^{73}$ | Henderson |
| Upchurch, Thaddeus Gilbert, GP $^{40}$ | Smithfield |
| Valk, Arthur DeTalma (Hon.), S $^{25}$ | Winston-Salem |
| Van Gorder, Charles O., GP $^{15}$ | Andrews |
| Vance, S. W., GP $^{45}$ | Mars Hill |
| Vann, Herbert Moffett, Anat $^{24}$ | Winston-Salem |
| Vann, Junius Richardson, GP $^{24}$ | Spring Hope |
| Vaughan, Edwin Warner, A&I $^{31}$ | Greensboro |
| Vaughan, Roland Harris, GP $^{16}$ | Edenton |
| Vaughan, Walter Weddle, R $^{23}$ | Durham |
| Venning, William L., Pd $^{48}$ | Charlotte |
| Verdery, William Carey, Pd $^{20}$ | Fayetteville |
| Verner, Carl Hugh, Pd $^{66}$ | Forest City |
| *Vernon, James Taylor, P $^{9}$ | Morganton |
| *Vernon, James William (Hon.), P $^{9}$ | Morganton |
| Vestal, Willis Jasper (Hon.), P $^{21}$ | Lexington |
| Wadsworth, Harvey Bryan, GP $^{19}$ | New Bern |
| Walden, Kennon C., S $^{52}$ | Wilmington |
| Walker, Elmer Pixley, GP $^{52}$ | Wilmington |
| Walker, John Barrett (Hon.), GP $^{1}$ | Burlington |
| Walker, Landon D., GP $^{48}$ | Charlotte |
| Walker, Lillie C., P $^{8}$ | Asheville |
| Walker, Louis Kyle, GP $^{36}$ | Ahoskie |
| Walker, Robert Jeffreys, Jr., GP $^{30}$ | Snow Hill |
| Wall, G. Ritchie, GP $^{69}$ | Albemarle |
| Wall, Roger Irving, OALR $^{74}$ | Raleigh |
| *Wall, Roscoe LeGrand (Hon.), Anes $^{25}$ | Winston-Salem |
| *Wall, William Stanley, Ob $^{24}$ | Rocky Mount |
| Wallace, Lew Ernest, S $^{35}$ | Hendersonville |
| Waller, L. C., GP $^{8}$ | Candler |
| Wallin, Loren, PH $^{2}$ | Wadesboro |
| Walters, Charles Manley (Hon.), GP $^{1}$ | Burlington |
| Walton, Cyrus Leslie, Ob $^{9}$ | Glen Alpine |
| Walton, George Britain, GP $^{18}$ | Chadbourn |
| *Wannamaker, Edward Jones, Jr., I $^{48}$ | Charlotte |
| Ward, Ernest, PH $^{38}$ | Statesville |
| *Ward, Frank P., I $^{63}$ | Lumberton |
| *Ward, Ivie Alphonso (Hon.), OALR $^{16}$ | Hertford |
| Ward, Jesse Elliott (Hon.), GP $^{46}$ | Robersonville |
| *Ward, John LaBruce, P $^{8}$ | Asheville |
| Ward, Vernon Albert (Hon.), I $^{46}$ | Robersonville |
| Ward, Wallace Clyde, GP $^{74}$ | Raleigh |
| Ward, Walter Elliott, I $^{46}$ | Robersonville |
| Ward, William Titus, GP $^{74}$ | Raleigh |

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* Present at 1947 meeting.
† Deceased.

Warfield, Mary Cabell, Pd $^{3}$......Blowing Rock
*Warren, Robert Franklin (Hon.), GP $^{1}$......Prospect Hill
Warrick, Luby Albert, GP $^{76}$......Goldsboro
Warshauer, Samuel E., I $^{52}$......Wilmington
Warwick, Hight Claudius, Anes $^{31}$......Greensboro
Washburn, Benjamin Earl, PH $^{66}$......Rutherfordton
Washburn, Chivous Yulan, GP $^{17}$......Mooresboro
Washburn, Wyan, GP $^{17}$......Shelby
Watkins, Carlton Gunter, Pd $^{48}$......Charlotte
Watkins, George Thomas, Jr. (Hon.), GP $^{23}$......Durham
Watkins, John Armstrong, ObG $^{8}$......Asheville
Watkins, William Merritt, GP $^{23}$......Durham
Watson, George A., Pd $^{23}$......Durham
Watson, Hugh Alfred, GP $^{31}$......Greensboro
Watson, Samuel Parks, ALR $^{19}$......New Bern
Way, John E., S $^{12}$......Beaufort
*Way, Samuel Eason, S $^{24}$......Rocky Mount
Weathers, Bahnson, S $^{32}$......Roanoke Rapids
*Weathers, Bailey Graham, GP $^{27}$......Stanley
*Weathers, Rupert Ryan, GP $^{74}$......Knightsdale
Weaver, William Jackson (Hon.), Pr $^{8}$......Asheville
Webb, Alexander, Jr., S $^{74}$......Raleigh
Webb, William P. (Hon.), GP $^{62}$......Rockingham
Webster, Ben, Oph $^{71}$......Brevard
Weeks, John F., GP $^{56}$......Elizabeth City
*Weeks, Kenneth Durham, I $^{24}$......Rocky Mount
Weinstein, Morton Hannah, GP $^{63}$......Fairmont
Weinstein, Rayford Lee, GP $^{63}$......Fairmont
Weiters, John Christopher $^{39}$......Bryson City
Weizenblatt, Sprinza, Oph $^{8}$......Asheville
Welfare, Charles R., I $^{25}$......Winston-Salem
Wellborn, William R., GP $^{38}$......Elkin
Wells, Warner L., S $^{74}$......Raleigh
*Welton, David Goe, D $^{48}$......Charlotte
Welton, Felix Burwell, S $^{18}$......Whiteville
Wessell, John Charles (Hon.), I $^{52}$......Wilmington
West, Bryan Clinton, Pd $^{42}$......Kinston
West, Clifton Forrest, GP $^{42}$......Kinston
West, Louis Nelson (Hon.), OALR $^{74}$......Raleigh
Westmoreland, Joseph Robert, GP $^{34}$......Canton
Whaley, James Davant, U $^{13}$......Hickory
Wharton, Charles Watson, GP $^{40}$......Smithfield
Wheeler, James Hartwick, GP $^{73}$......Henderson
Wheless, Thomas O., GP $^{26}$......Louisburg
Whelpley, Frank Livingston, P $^{76}$......Goldsboro
Whichard, Murray Parmer, PH $^{16}$......Edenton
Whicker, Guy Lorraine, GP $^{10}$......Kannapolis
Whicker, Max Evans, GP $^{65}$......China Grove
Whilden, James Griffith, R $^{23}$......Durham
Whisnant, Albert Miller (Hon.), OALR $^{48}$......Charlotte
Whitaker, D. N., GP $^{74}$......Raleigh
*Whitaker, James Allen, PH $^{24}$......Rocky Mount
*Whitaker, Paul Frederick, I $^{42}$......Kinston
*Whitaker, Richard Bidgood (Hon.), GP $^{18}$......Whiteville
Whitaker, Richard Harper, GP $^{25}$......Kernersville
White, Clarence Hunt, Oph $^{73}$......Henderson
*White, Estus, GP $^{10}$......Kannapolis
White, Francis Willard Moody, GP $^{32}$......Halifax
White, Robert Alexander, Ob $^{8}$......Asheville
White, Thomas Preston, I $^{48}$......Charlotte
*White, William Henry Clay, S $^{56}$......Elizabeth City
Whitehead, Seba L., D $^{8}$......Asheville
Whitehill, L. A., I $^{31}$......High Point
Whitfield, Bryan Watkins, GP $^{15}$......Murphy
Whitley, Ayer, GP $^{48}$......Matthews
Whitley, Robert Macon, Jr., I $^{24}$......Rocky Mount
Whitt, Walter Fulton, Jr. $^{72}$......Monroe
Whittington, Claude Thomas, S $^{31}$......Greensboro
Whittington, James Benbow (Hon.), Hosp Ad. $^{25}$......Winston-Salem
Widenhouse, Martin Aubrey, GP $^{10}$......Concord

Wilder, Raboteau Terrell, GP $^{18}$......Fair Bluff
*Wilkerson, Annie Louise, ObG $^{74}$......Raleigh
Wilkerson, Jesse Bert, GP $^{71}$......Brevard
Wilkes, Grover W. $^{39}$......Sylva
Wilkes, Marcus Branch, GP $^{68}$......Laurinburg
Wilkins, Java Cleveland, GP $^{1}$......Haw River
Wilkins, Robert Bruce (Hon.), OALR $^{23}$......Durham
Wilkins, Samuel A., Sr. (Hon.), GP $^{27}$......Dallas
*Wilkinson, C. T. $^{74}$......Wake Forest
Wilkinson, James S., D $^{74}$......Wake Forest
Wilkinson, Louis Lee, GP $^{31}$......High Point
*Wilkinson, Robert Watson, Jr., GP $^{74}$ Wake Forest
Willcox, Jesse Womble (Hon.), T $^{51}$......Wilmington
Williams, Albert Franklin (Hon.), GP $^{78}$......Wilson
Williams, Charles Frederick, Pd $^{74}$......Raleigh
Williams, Edward Jerome, GP $^{72}$......Monroe
Williams, Jabez H., PH $^{8}$......Oteen
Williams, James Marcus, GP $^{22}$......Warsaw
Williams, John Drewey (Hon.), GP $^{31}$......Guilford Station
Williams, John Dudley, Jr., GP $^{31}$......Greensboro
*Williams, John W., PH $^{46}$......Williamston
Williams, Lester L., GP $^{49}$......Spruce Pine
*Williams, Leonidas Polk, GP $^{16}$......Edenton
*Williams, Lynwood Earl, I $^{42}$......Kinston
Williams, McChord, S $^{48}$......Charlotte
Williams, Robert, R $^{74}$......Raleigh
Williams, Roderick Thomas, GP $^{59}$......Farmville
*Williams, Samuel Hodges, Jr., S $^{5}$......Washington
Williams, Tom Alfred, PN $^{8}$......Asheville
Williamson, Rossie Marshall, GP $^{18}$......Tabor City
Willis, Arthur Ponder (Hon.), GP $^{8}$......Candler
Willis, Byrd Charles (Hon.), S $^{24}$......Orange, Va.
Willis, Candler Arthur, GP&S $^{8}$......Candler
Willis, Harry Clay, OALR $^{78}$......Wilson
*Willis, Henry Stuart, T $^{37}$......Sanatorium
Willis, William Henry, Jr., GP $^{19}$......New Bern
Wilmerding, William Edward, GP $^{8}$......Skyland
Wilsey, John D., Oph $^{25}$......Winston-Salem
Wilson, Clarence L. (Hon.), GP $^{11}$......Lenoir
Wilson, Frank E., Deputy Med. Director, Red Cross $^{10}$......Washington, D. C.
Wilson, George D., I $^{8}$......Asheville
Wilson, Newton Graves (Hon.), GP $^{64}$......Madison
Wilson, Roeby Bryant, Anes $^{8}$......Asheville
Wilson, Samuel Allen $^{43}$......Lincolnton
Wilson, Stephen Glenn $^{33}$......Angier
Wilson, Thomas Barnette, Path $^{74}$......Raleigh
Wilson, William Gilliam, GP $^{40}$......Smithfield
Wilson, W. Howard, I $^{74}$......Raleigh
Winkler, Harry, Or $^{48}$......Charlotte
Winstead, Ellis Grey, GP $^{5}$......Belhaven
Winstead, John Lindsay, S $^{59}$......Greenville
Winston, Patrick Henry, GP $^{29}$......Clarksville, Va.
Wise, N. Bowman, I $^{23}$......Durham
*Wisely, Martin Robert, GP $^{16}$......Edenton
Wiseman, Perry Haynes, GP $^{66}$......Avondale
Withers, William A., I $^{74}$......Raleigh
Wolfe, Harold E., D&R $^{76}$......Goldsboro
Wolfe, Hugh Claibourne, OALR $^{31}$......Greensboro
*Wolfe, Nathan Carl, GP $^{57}$......Burgaw
Wolfe, Ralph Verlon, GP $^{25}$......Winston-Salem
*Woltz, John Henry Early, ObG $^{48}$......Charlotte
Woltz, John Louis (Hon.) $^{70}$......Mt. Airy
Womble, Edwin C., GP $^{68}$......Wagram
Womble, William Hugh, Jr. $^{31}$......Greensboro
*Wood, Frank, S $^{16}$......Edenton
Wood, George Thomas, S $^{31}$......High Point
Wood, Hagan Emmett, T $^{8}$......Black Mountain
*Wood, Martha $^{16}$......Edenton
Wood, William L., GP $^{70}$......Boonville
Wood, William Reed $^{31}$......Greensboro
Woodard, Albert G. (Hon.), Oph $^{76}$......Goldsboro
Woodard, Barney Lelon, GP $^{40}$......Kenly
Woodard, Charles Augustus (Hon.), S $^{78}$......Wilson

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* Present at 1947 meeting.

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| Woodburn, C. H., PH $^{32}$ | Littleton |
| Woodhall, Maurice Barnes, NS $^{23}$ | Durham |
| Woodruff, Fred Gwyn, GP $^{31}$ | High Point |
| Woodruff, William E., S $^{61}$ | Asheboro |
| Woods, James Baker, Jr., GP $^{48}$ | Davidson |
| Woodson, Charles Whitehead (Hon.), GP $^{65}$ | Salisbury |
| Woody, John Wycliffe Austin $^{60}$ | Tryon |
| Wooten, Amos Monroe, GP $^{24}$ | Pinetops |
| Wooten, Floyd Pugh, S $^{42}$ | Kinston |
| Wooten, Jane Herring $^{74}$ | Raleigh |
| Worley, James Harr $^{8}$ | Asheville |
| Wrenn, Creighton, GP $^{38}$ | Mooresville |
| Wrenn, Grover Cleveland, GP $^{14}$ | Siler City |
| Wrenn, S. M., S&G $^{63}$ | Lumberton |
| *Wright, C. N., GP $^{56}$ | Jarvisburg |
| Wright, Frederick Starr $^{8}$ | Asheville |
| Wright, James Rhodes, OALR $^{74}$ | Raleigh |
| Wright, John Bryan (Hon.), OALR $^{74}$ | Raleigh |
| *Wright, John Everett, GP $^{24}$ | Macclesfield |
| Wright, John Joseph, PH $^{23}$ | Chapel Hill |
| Wright J. T., GP $^{78}$ | Bailey |
| Wright, Orpheus Evans, GP $^{25}$ | Winston-Salem |
| Wright, R. B., Jr. $^{65}$ | Salisbury |
| Wright, Thomas Hasel, Jr., P $^{48}$ | Charlotte |
| Wyatt, Arthur Thomas $^{33}$ | Raleigh |
| Wyatt, Hubert Lee, GP $^{65}$ | China Grove |
| Wyatt, Wortham (Hon.), D $^{25}$ | Winston-Salem |
| Wylie, William deKalb, I $^{25}$ | Winston-Salem |
| Yarborough, Frank Ray, ALR $^{74}$ | Cary |
| Yates, Percy Fenton, GP $^{40}$ | Clayton |
| *Yoder, Paul Allison, T $^{25}$ | Winston-Salem |
| York, Alexander Arthur (Hon.), GP $^{31}$ | High Point |
| *Young, David A., P $^{74}$ | Raleigh |
| Young, John Clingman, U $^{8}$ | Asheville |
| Young, Joseph A., GP $^{13}$ | Newton |
| *Young, Robert Foster, PH $^{32}$ | Halifax |
| Youngblood, Vernon, GP $^{10}$ | Concord |
| *Yow, Daniel Eugene, I $^{10}$ | Concord |
| Yow, Ira A. (Hon.), GP $^{10}$ | Concord |
| Zealy, Albert Hazel, Jr., GP $^{76}$ | Goldsboro |
| Zimmerman, Robert U. (Hon.), GP $^{21}$ | Welcome |

* Present at 1947 meeting.

**Key to Specialties**

A—Allergy
Anes—Anesthesiology
ALR—Otology, Laryngology, Rhinology
Bact—Bacteriology
C—Cardiovascular Disease
CP—Clinical Pathology
D—Dermatology
ED—Medical Education
G—Gynecology
GE—Gastroenterology
GP—General Practice
Hosp Ad—Hospital Administration
Hosp Res—Hospital Resident
I—Internal Medicine
Ind—Industrial Practice
Ins—Insurance
N—Neurology
NS—Neurological Surgery
OALR—Ophthalmology, Otology, Laryngology, Rhinology
Ob—Obstetrics
ObG—Obstetrics, Gynecology
Oph—Ophthalmology
Or—Orthopedic Surgery
Otol—Otology
P—Psychiatry
PN—Psychiatry, Neurology
Path—Pathology
Pd—Pediatrics
PH—Public Health
Phar—Pharmacology
Phy—Physiology
Pr—Proctology
R—Roentgenology, Radiology
S—Surgery
T—Tuberculosis
U—Urology

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ADDITIONAL COPIES of the ALPHABETICAL LIST

and

ROSTER OF FELLOWS BY COUNTIES

are available from

DR. ROSCOE McMILLAN, Red Springs

at 25c per copy.

# ROSTER OF FELLOWS FOR 1947

## By Counties

NOTE: We have endeavored to secure correct information in regard to every physician whose name is listed. Anyone finding an error should report it immediately to the Secretary of the State Society.

### ALAMANCE-CASWELL COUNTIES SOCIETY[1]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Cook, William Eugene, T, Mebane; Washington Univ., 1930 | 1930 | 1934 |
| **Secretary:** Simmons, Alexander Wingate, GP, Burlington; Jefferson, 1939 | 1939 | 1940 |
| †Anderson, Charles Alexander (Hon.), GP, Burlington; Coll. of P&S, Baltimore, 1893 | 1893 | 1896 |
| Bell, Felix Ortan, GP, Burlington; Atlanta Med. Coll., 1918 | 1921 | 1928 |
| Bennett, J. W., GP, Burlington; Temple, 1940 | 1941 | 1946 |
| Braddy, Wade Hampton (Hon.), GP, Burlington; Univ. of N. C., 1909 | 1909 | 1913 |
| Brooks, Ralph Elbert, U, Burlington; Jefferson, 1920 | 1920 | 1922 |
| Carrington, George Lunsford, S, Burlington; Johns Hopkins, 1920 | 1920 | 1925 |
| Crisman, C. S., GP, Graham; Temple, 1942 | 1942 | 1947 |
| Dickson, Malcolm Shields, GP, Burlington; Med. Coll. of S. C., 1927 | 1927 | 1929 |
| Ellington, Amzi Jefferson (Hon.), OALR, Burlington; Columbia, 1915 | 1915 | 1917 |
| Goley, Willard Coe, G, Graham; Univ. of Pa., 1924 | 1924 | 1926 |
| Greene, Phares Yates, GP, Burlington; Northwestern, 1932 | 1932 | 1934 |
| Gwynn, Houston LaFayette, GP, Yanceyville; Med. Coll. of Va., 1923 | 1923 | 1925 |
| Harden, Boyd, GP&S, Burlington; Univ. of Pa., 1928 | 1931 | 1931 |
| Harden, Graham. GP, Burlington; Univ. of Pa., 1919 | 1920 | 1922 |
| †Harper, Frank Trumbo, T, Burlington; Med. Coll. of Va., 1934 | 1934 | 1936 |
| Johnson, Joseph Lewis, GP, Graham; Jefferson, 1926 | 1926 | 1930 |
| Kernodle, Harold B., Or, Burlington; Duke, 1939 | 1941 | 1946 |
| Lawson, George William, GP, Graham; Long Island Coll. of Med., 1935 | 1935 | 1938 |
| Lupton, Emmett Stevenson, Pd, Graham; N. Y. Univ. Sch. of Med., 1938 | 1938 | 1940 |
| McDade, Brodie Banks, Ob, Burlington; Univ. of Md., 1918 | 1918 | 1920 |
| McLamb, George Thomas, GP, Mebane; Univ. of Tenn., 1938 | 1941 | 1942 |
| McPherson, Charles Wade (Hon.), OALR, Burlington; Univ. of Md., 1910 | 1910 | 1912 |
| Moore, Henry Blanchard, G. Burlington; Jefferson, 1920 | 1920 | 1923 |
| Robinson, Donald Edward, Pd. Burlington; Harvard, 1927 | 1929 | 1930 |
| Scott, Samuel Floyd, GP, Burlington; Univ. of Pa., 1918 | 1918 | 1920 |
| Simpson, Henry Hardy, GP, Elon; Univ. of Md., 1925 | 1925 | 1926 |
| Smith, Fitzhugh Lee, GP, Burlington; Univ. of Pittsburgh, 1927 | 1927 | 1928 |
| Spoon, Samuel Clarence, ObG, Burlington; Univ. of Md., 1918 | 1918 | 1920 |
| Troxler. Raymond Moody (Hon.), GP, Burlington; Univ. of Md., 1914 | 1914 | 1915 |
| Tyson, Thomas David (Hon.), Pr, Mebane; Univ. Coll. of Med., Richmond, 1899 | 1899 | 1904 |
| Walker, John Barrett (Hon.), GP, Burlington; Med. Coll. of Va., 1914 | 1914 | 1916 |
| Walters, Charles Manley (Hon.), GP, Burlington; Univ. of Md. and Coll. of P. & S., Baltimore, 1908 | 1908 | 1909 |
| Warren, Robert Franklin (Hon.), GP, Prospect Hill; Atlanta School of Med., 1911 | 1911 | 1912 |
| Wilkins, Java Cleveland, GP, Haw River; Univ. of Md., 1911 | 1911 | 1920 |

### ALEXANDER—SEE IREDELL-ALEXANDER

### ALLEGHANY—SEE WILKES-ALLEGHANY

### ANSON COUNTY SOCIETY[2]

| | | |
|---|---|---|
| **President:** Sorrell, Furman Yates, GP, Wadesboro; Jefferson, 1930 | 1930 | 1933 |
| **Secretary:** Kress, Jacob Himi, S, Wadesboro; Med. Coll. of Va., 1936 | 1938 | 1939 |
| Allen, Charles Insley, S, Wadesboro; Columbia, 1913 | 1913 | 1922 |
| Bennett. Joseph Hammond (Hon.), GP, Wadesboro; Univ. of Md., 1894 | 1894 | 1904 |
| Carter, Warren Dallas, PH, Wadesboro; Med. Coll. of S. C., 1934 | 1935 | 1936 |
| Covington, James Madison, Jr., GP, Wadesboro; Duke, 1938 | 1940 | 1942 |
| Davis, James Matheson, Pd, Wadesboro; Columbia, 1913 | 1913 | 1920 |
| Kress, Esta Joyce Levy, Pd, Wadesboro; Med. Coll. of Va., 1935 | 1938 | 1939 |
| McKinnon, W. J., Wadesboro; Univ. of Md., 1940 | 1946 | 1946 |
| Wallin, Loren, PH, Wadesboro; Univ. of Tenn., 1909 | 1909 | 1938 |

### ASHE-WATAUGA COUNTIES SOCIETY[3]

| | | |
|---|---|---|
| **President:** Jones, Dean Cicero, GP, Jefferson; Univ. of Pa., 1927 | 1930 | 1930 |
| **Secretary:** King, Robert Rogers, Jr., PH, Boone; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Ballou, James Larkin, Oph, Grassy Creek; Jefferson, 1901 | 1901 | 1901 |
| Bingham, Robert Knox, GP, Boone; Univ. of Tenn., 1905 | 1909 | 1909 |

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† Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Eller, Carlton Reaves, GP, West Jefferson; Univ. of N. C., 1911 | 1915 | 1917 |
| Garvey, Robert Robey, U, Blowing Rock; N. C. Med. Coll., 1915 | 1915 | 1919 |
| Hagaman, John Bartlett (Hon.), GP, Boone; Univ. of Tenn., 1915 | 1915 | 1917 |
| Hagaman, Len Doughton, PH, Boone; Univ. of Pa., 1936 | 1936 | 1938 |
| Harmon, Raymond Harris, Boone; Med. Coll. of Va., 1936 | 1936 | 1936 |
| Jones, Arthur Lee, GP, Lansing; Univ. Coll. of Med., Richmond, 1901 | 1901 | 1941 |
| Jones, Clyde T., GP, West Jefferson; Univ. of Tenn., 1940 | 1945 | 1946 |
| Long, Lester Lee, GP, West Jefferson; Lincoln Memorial Univ., 1916 | 1916 | 1934 |
| Perry, Henry B., GP, Boone; N. C. Med. Coll., 1905 | 1905 | 1922 |
| Perry, Henry Baker, Jr., GP, Boone; Univ. of Md., 1943 | 1943 | 1947 |
| Ray, Ritz Clyde, GP, West Jefferson; Med. Coll. of Va., 1916 | 1916 | 1917 |
| Robinson, W. J., GP, Creston; Med. Coll. of Kansas City, 1904 | 1907 | 1917 |
| Warfield, Mary Cabell, Pd, Blowing Rock; Woman's Med. Coll. of Pa., 1922 | 1928 | 1935 |

## AVERY COUNTY SOCIETY[4]

| | | |
|---|---|---|
| **President:** Moffett, Alexander Stuart, S, Banner Elk; Vanderbilt, 1932 | 1942 | 1943 |
| **Secretary:** Fink, Emma Sloop, GP, Crossnore; Vanderbilt, 1936 | 1938 | 1938 |
| Bailey, Hilda H., GP, Banner Elk; Univ. of Pa., 1945 | 1946 | 1947 |
| Burleson, William Brown (Hon.), GP, Plumtree; Univ. of Md., 1915 | 1915 | 1916 |
| Prusa, Victor H., GP, Banner Elk; Univ. of Iowa, 1936 | 1939 | 1946 |
| Sloop, Eustace H. (Hon.), GP, Crossnore; N. C. Med. Coll., 1905; Jefferson, 1908 | 1905 | 1907 |
| Tate, William Cummings (Hon.), S, Banner Elk; Tenn. Med. Coll., 1908 | 1909 | 1912 |

## BEAUFORT COUNTY SOCIETY[5]

| | | |
|---|---|---|
| **President:** Salle, George F., GP, Washington; Med. Coll. of Va., 1933 | 1933 | 1946 |
| **Secretary:** Ford, David Emerson, PH, Washington; Univ. of Mich., 1908 | 1924 | 1925 |
| Bonner, John Bryan, GP, Aurora; Univ. of Md., 1918 | 1918 | 1920 |
| Bynum, C. C., GP, Belhaven; Jefferson, 1943 | 1943 | 1946 |
| Hackler, Robert Hardin, Jr., R, Washington; Jefferson, 1926 | 1926 | 1928 |
| Himmelwright, G. G., S, Washington; Univ. of Va., 1937 | 1940 | 1947 |
| Larkin, Ernest Waddill, OALR, Washington; Med. Coll. of Va., 1917 | 1920 | 1922 |
| Nicholson, Plummer A. (Hon.), Ob, Washington; Coll. of P. & S., Baltimore, 1889 | 1889 | 1890 |
| Peters, August Richard, Jr., Pd, Washington; Univ. of Ga., 1935 | 1938 | 1939 |
| Piver, William C., GP, Washington; Hahnemann Med. Coll., 1941 | 1946 | 1946 |
| Ramsay, James Graham, S, Washington; Univ. of Pa., 1922 | 1924 | 1924 |
| Rodman, Clark, GP, Washington; Jefferson, 1943 | 1943 | 1947 |
| Swindell, Lewis Holmes, GP&S, Washington; Univ. of Pa., 1916 | 1916 | 1919 |
| Tavloe, John Cotten, Ob, Washington; Univ. of Pa., 1922 | 1924 | 1925 |
| Williams, Samuel Hodges, Jr., S, Washington; Univ. of Pa., 1942 | 1943 | 1944 |
| Winstead, Ellis Grey, GP, Belhaven; Med. Coll. of Va., 1929 | 1929 | 1930 |

## BERTIE COUNTY SOCIETY[6]

| | | |
|---|---|---|
| **President:** Norfleet, Edgar Powell, Pd, Roxobel; Med. Coll. of Va., 1914 | 1914 | 1920 |
| **Secretary:** Garriss, Frank Henry, PH, Lewiston; Jefferson, 1912 | 1912 | 1918 |
| Castellow, Cola, S, Windsor; Univ. of Pa., 1917 | 1917 | 1926 |
| Credle, Carroll Spencer, GP, Colerain; Med. Coll. of Va., 1932 | 1932 | 1941 |
| Credle, William Swindell, GP, Colerain; Univ. of Va., 1940 | 1940 | 1947 |
| Lewis, Sigma Van, Windsor; Med. Coll. of Va., 1916 | 1916 | 1923 |
| Saunders, Sheldon Asa, GP, Aulander; Jefferson, 1914 | 1914 | 1918 |
| Smith, Joseph Elmer, GP, Windsor; Med. Coll. of Va., 1921 | 1921 | 1922 |

## BLADEN COUNTY SOCIETY[7]

| | | |
|---|---|---|
| **President:** Clark, DeWitt Duncan, GP, Clarkton; Med. Coll. of Va., 1917 | 1917 | 1920 |
| **Secretary:** Bridger, Dewey Herbert, GP, Bladenboro; Jefferson, 1922 | 1922 | 1925 |
| Bennett, Ernest Claxton, GP, Elizabethtown; Med. Coll. of Va., 1926 | 1926 | 1927 |
| Cromartie, Robert S. (Hon.), PH, Elizabethtown; N. C. Med. Coll., 1900 | 1900 | 1906 |
| Glenn, Channing, GP, Elizabethtown; Med. Coll. of Va., 1933 | 1936 | 1939 |
| Hutchinson, Sankey Smith (Hon.), S, Bladenboro; N. C. Med. Coll., 1911 | 1911 | 1912 |
| Singletary, George Currie, GP, Clarkton; Univ. of Pa., 1917 | 1917 | 1918 |

## BRUNSWICK COUNTY SOCIETY

## BUNCOMBE COUNTY SOCIETY[8]

| | | |
|---|---|---|
| **President:** Clark, Harold Stevens, S, Asheville; Univ. of Pa., 1922 | 1922 | 1924 |
| **Secretary:** Atkins, Stanley Sisco, Or, Asheville; Cornell, 1937 | 1943 | 1943 |
| Ambler, Arthur Chase, Anes, Asheville; Jefferson, 1920 | 1921 | 1922 |
| Anderson, Norman LaRue, Black Mountain; Duke, 1939 | 1945 | 1945 |
| Armentrout, Charles H., I, Asheville; Med. Coll. of Va., 1931 | 1940 | 1941 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Bailey, Harmon J., ObG, Asheville; Washington Univ., 1934 | 1946 | 1946 |
| Belcher, Cecil Cullen, U, Asheville; Tulane, 1930 | 1939 | 1940 |
| Bell, L. Nelson, S, Asheville; Med. Coll. of Va., 1916 | 1941 | 1942 |
| Bennett, Basil, P, Asheville; Univ. of Tenn., 1931 | 1946 | 1946 |
| Bittinger, Samuel Moffett, T, Oteen; George Washington Univ., 1918 | 1924 | 1924 |
| Brewton, William Allan, Ind, Enka; Univ. of Pa., 1927 | 1927 | 1929 |
| Briggs, Henry Harrison, Oph, Asheville; Yale, 1931 | 1933 | 1934 |
| Brookshire, Harley Gaskill (Hon.), GP, Asheville; N. C. Med. Coll., 1905 | 1905 | 1906 |
| Brown, Kermit English, ObG, Asheville; Jefferson, 1927 | 1927 | 1930 |
| Brownsberger, Ethel May, GP, Biltmore; Coll. of Med. Evangelists, 1927 | 1933 | 1934 |
| Buckner, James Marion (Hon.), S, Swannanoa; Univ. of N. C., 1909 | 1909 | 1912 |
| Burton, Claude Naylor, ObG, Asheville; Univ. of Cincinnati, 1936 | 1938 | 1938 |
| Carr, Catherine C., GP, Biltmore; Johns Hopkins, 1919 | 1942 | 1942 |
| Carr, Eugene Morrison, I, Asheville; Johns Hopkins, 1919 | 1926 | 1927 |
| Carroll, R. Charman, PN, Durham; Univ. of Colorado, 1939 | 1941 | 1941 |
| Chandler, Weldon P., GP, Weaverville; Univ. of Md., 1940 | 1940 | 1946 |
| Chapman, Edwin James, ALR, Asheville; Northwestern, 1928 | 1939 | 1940 |
| Cherry, James Henderson, Or, Asheville; Duke, 1933 | 1939 | 1941 |
| Clapp, Hubert Lee, GP, Swannanoa; Univ. of Ga., 1937 | 1938 | 1938 |
| Cocke, Jere Ellis (Hon.), Asheville; Louisville Med. Coll., 1905 | 1905 | 1906 |
| Codnere, John T., U, Asheville; Univ. of Toronto, 1938 | 1946 | 1946 |
| Cooley, Samuel Studdiford, GP, Black Mountain; N. Y. Univ., 1934 | 1934 | 1938 |
| Craddock, Alva Brown, I, Asheville; Johns Hopkins, 1918 | 1923 | 1924 |
| Croom, Gabe Holmes, P, Asheville; N. C. Med. Coll., 1909 | 1909 | 1916 |
| Crow, Samuel Leslie, I, Asheville; Emory, 1925 | 1926 | 1927 |
| Crump, Cecil Lavon, OALR, Asheville; Baylor Univ., 1930 | 1935 | 1936 |
| Crump, George Curtis, I, Asheville; Harvard, 1926 | 1933 | 1934 |
| Daniels, Robert E., GP, Asheville; Univ. of Indiana, 1928 | 1945 | 1946 |
| Donnelly, Grant Lester, GP, Oteen; Duke, 1933 | 1933 | 1935 |
| Eckel, O. F. (Hon.), Anes, Asheville; Med. Coll. of S. C., 1906 | 1907 | 1908 |
| Edwards, Bertie Oscar (Hon.), I, Asheville; N. C. Med. Coll., 1905 | 1905 | 1909 |
| Farmer, W. E., I, Asheville; Tulane, 1939 | 1947 | 1947 |
| Farnsworth, David I., Oteen; Louisiana State Univ., 1941 | 1946 | 1947 |
| Feldman, Leon Henry, I, Asheville; Univ. of Md., 1934 | 1938 | 1938 |
| Freeman, William Talmage, Pd, Biltmore; Univ. of Ga., 1917 | 1927 | 1929 |
| Gilbert, George G., U, Asheville; Johns Hopkins, 1938 | 1947 | 1947 |
| Gillespie, Samuel Crawford, I, Asheville; Univ. of Cincinnati, 1931 | 1935 | 1936 |
| Grantham, Wilmer Lloyd (Hon.), U, Asheville; N. C. Med. Coll., 1906 | 1906 | 1908 |
| Greene, Joseph Berry (Hon.), OALR, Asheville; Univ. of Va., 1893 | 1910 | 1911 |
| Griffin, Mark Alexander, P, Asheville; Jefferson, 1917 | 1917 | 1918 |
| Griffin, William Ray (Hon.), PN, Asheville; Jefferson, 1910 | 1910 | 1917 |
| Griffith, Franklin Webb (Hon.), S, Asheville; Johns Hopkins, 1906 | 1911 | 1912 |
| Griffith, Lewie Muller, OALR, Asheville; Johns Hopkins, 1915 | 1916 | 1918 |
| Hartman, Bernhard Henry, P, Asheville; Yale, 1937 | 1941 | 1942 |
| Henderson-Smathers, Irma Carlene, ObG, Asheville; Tulane, 1933 | 1934 | 1935 |
| Hensley, Charles Albert, OALR, Asheville; Jefferson, 1917 | 1917 | 1927 |
| Herbert, William P. (Hon.), S, Asheville; Univ. of Va., 1907 | 1910 | 1911 |
| Hollyday, William Murray (Hon.), OALR, Asheville; Univ. of Md., 1908 | 1914 | 1915 |
| Huffines, Thomas Ruffin, U, Asheville; Indiana Univ., 1919 | 1922 | 1924 |
| Huston, John Walter (Hon.), T, Asheville; Rush Med. Coll., 1904 | 1912 | 1913 |
| Ivey, Robert Robbins, S, Asheville; Univ. of Ala., 1909 | 1921 | 1921 |
| Jacobs, Paul, GP, Oteen; Univ. of Arkansas, 1934 | 1945 | 1946 |
| Johnson, Walter Royle, I, Asheville; Univ. of Minn., 1924 | 1933 | 1934 |
| Justice, William Shipp, S, Asheville; Harvard, 1926 | 1930 | 1931 |
| Karansky, Stanley, GP, Enka; Duke, 1941 | 1946 | 1946 |
| Keithan, John F., S, Asheville; Jefferson, 1934 | 1946 | 1946 |
| King, Edward, Anes, Asheville; Harvard, 1917 | 1921 | 1922 |
| Kittleson, Horace O., GP, Asheville; Temple, 1941 | 1946 | 1947 |
| Knoefel, Arthur Eugene, Jr., GP, Black Mountain; Louisiana State Univ., 1935 | 1935 | 1938 |
| Kodack, Albert, GP&S, Asheville; Univ. of Toronto, 1940 | 1943 | 1946 |
| Koontz, E. Ransom, Oteen; Univ. of Mich., 1932 | 1946 | 1947 |
| Lindberg, Oliver Spurgeon, GP, Asheville; Coll. of Med. Evangelists, 1923 | 1925 | 1928 |
| Lord, Margery Juline, PH, Asheville; Univ. of Mich., 1916 | 1918 | 1919 |
| Lott, William Clifton, U, Asheville; Univ. of Colorado, 1929 | 1930 | 1931 |
| Lyda, Edgar W., GP, Asheville; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Lynch, James Madison (Hon.), S, Asheville; Univ. of Md., 1904 | 1912 | 1913 |
| MacRae, John Donald, R, Asheville; Univ. of Pa., 1927 | 1927 | 1930 |
| Mahoney, J. W., ObG, West Asheville; Georgetown Univ., 1926 | 1946 | 1947 |
| Matros, Nathaniel Hamilton, S, Asheville; Marquette Univ., 1930 | 1933 | 1934 |
| Matthews, Wallace Russell, Pd, Asheville; Univ. of Western Ontario, Canada | 1944 | 1945 |
| McCall, Alvin Clay (Hon.), OALR, Asheville; Univ. of Md., 1910 | 1910 | 1914 |
| McCall, William Herbert, OALR, Asheville; Med. Coll. of Va., 1938 | 1941 | 1941 |
| McCracken, Marvin Howell, GP, Asheville; Univ. of Louisville, 1930 | 1930 | 1940 |

| *Name and Address* | *Licensed* | *Joined. State Society* |
|---|---|---|
| McGowan, Joseph Francis, OALR, Asheville; Univ. of Md., 1929 | 1937 | 1939 |
| McGuffin, William Christian, GP, Asheville; Coll. of Med. Evangelists, 1933 | 1935 | 1937 |
| McMahon, Francis J., Pr, Asheville; Univ. of St. Louis, 1925 | 1945 | 1946 |
| Mears, George Augustus, S, Asheville; Syracuse Univ., 1924 | 1924 | 1927 |
| Meriwether, Benjamin Morsell, S, Asheville; Univ. of Louisville, 1915 | 1915 | 1924 |
| Millender, Charles White, S, Asheville; Tulane, 1919 | 1921 | 1924 |
| Moore, Julian Alison, S, Asheville; Univ. of Pa., 1918 | 1918 | 1921 |
| Morgan, Burnice Earl, GP, Asheville; Univ. of Tenn., 1917 | 1921 | 1922 |
| Morgan, Grady Alexander, I, Asheville; Univ. of Tenn., 1917 | 1920 | 1926 |
| Morgenstern, Philip, T, Black Mountain; George Washington Univ., 1937 | 1946 | 1947 |
| Murphy, Gibbons Westbrook, R. Asheville; Emory, 1923 | 1923 | 1927 |
| Nailling, Richard C., S, Asheville; Vanderbilt, 1940 | 1943 | 1944 |
| Norburn, Charles Strickland, S, Asheville; Univ. of Va., 1917 | 1921 | 1924 |
| Norburn, Russell Lee, S, Asheville; Vanderbilt, 1925 | 1925 | 1927 |
| Orr, Charles Collins (Hon.), I, Asheville; Univ. of Md., 1904 | 1904 | 1905 |
| Orr. Porter B. (Hon.), GP, Asheville; Jefferson, 1901 | 1901 | 1904 |
| Parker, George Farrar, S, Asheville; Univ. of Pa., 1923 | 1924 | 1926 |
| Peasley, Elmus Day, Path, Asheville; Univ. of Iowa, 1927 | 1939 | 1940 |
| Pendleton, Wilson, I, Asheville; Univ. of Va., 1908 | 1919 | 1920 |
| Peters, David B., S, Asheville; George Washington Univ., 1917 | 1920 | 1941 |
| Pine, Irving, T, Oteen; N. Y. Med. Coll., 1932 | 1946 | 1946 |
| Powell, William F., OALR, Asheville; Duke, 1937 | 1946 | 1946 |
| Prather, F. G., GP, Asheville; Univ. of Md., 1923 | 1946 | 1947 |
| Profitt, Ray V., T, Asheville; Univ. of Colorado, 1918 | 1945 | 1946 |
| Quinn, David E., Oteen; George Washington Univ., 1930 | 1933 | 1934 |
| Raper, J. S., R, Asheville; Duke, 1938 | 1946 | 1946 |
| Reeves, Riley Jefferson, GP, Leicester; Vanderbilt, 1913 | 1913 | 1922 |
| Richardson, Frank Howard, P, Black Mountain; Cornell, 1906 | 1919 | 1920 |
| Ringer, Paul Henry (Hon.), T, Asheville; Columbia, 1904 | 1906 | 1907 |
| Russell, William Marler, OALR, Asheville; Univ. of Cincinnati, 1928 | 1931 | 1932 |
| Saunders, John Turner, Or, Asheville; Columbia, 1926 | 1934 | 1935 |
| Schaffle, Karl, I, Asheville; Univ. of Pa., 1907 | 1926 | 1927 |
| Schoenheit, Edward William, I, Asheville; Jefferson, 1920 | 1920 | 1921 |
| Severn, Henry D., Or, Asheville; Johns Hopkins, 1940 | 1946 | 1947 |
| Sevier, Joseph Thomas (Hon.), GP, Asheville; Jefferson, 1895 | 1895 | 1899 |
| Shuford, Mary Frances, Path, Asheville; Rush Med. Coll., 1934 | 1934 | 1935 |
| Shuler, Edward L., Asheville; Med. Coll. of S. C., 1940 | 1945 | 1946 |
| Sluder, Fletcher S., ObG, Asheville; Rush Med. Coll., 1938 | 1938 | 1946 |
| Smart, Gardner F., OALR, Asheville; Duke, 1940 | 1946 | 1947 |
| Smith, Bernard Reid (Hon.), I, Asheville; Jefferson, 1911 | 1913 | 1914 |
| Sprinkle, Charles Nichols, GP, Weaverville; Jefferson, 1910 | 1910 | 1922 |
| Stricker, Robert L., Anes&GP, Asheville; Univ. of Pa., 1941 | 1941 | 1946 |
| Suitt, Robert Burke, NP, Durham; St. Louis Univ. Sch. of Med., 1932 | 1933 | 1938 |
| Sullivan, Joseph Timothy, GP, Asheville; N. Y. Univ., 1933 | 1935 | 1937 |
| Swann, Cecil Collins, ALR, Asheville; Tulane, 1926 | 1930 | 1931 |
| Tennent, Gaillard S. (Hon.), Oph, Asheville; N. C. Med. Coll., 1894 | 1894 | 1898 |
| Thomas, Charles Darwin, T, Black Mountain; Univ. of Indiana, 1926 | 1930 | 1930 |
| Terry, Philip Roy, GP, Asheville; George Washington Univ., 1907 | 1912 | 1913 |
| Walker, Lillie C., P, Asheville; Univ. of Chicago, 1942 | 1945 | 1946 |
| Waller, L. C., GP, Candler; Coll. of Med. Evangelists, 1943 | 1946 | 1947 |
| Ward, John LaBruce, P, Asheville; Med. Coll. of S. C., 1905 | 1921 | 1922 |
| Watkins, John Armstrong, ObG, Asheville;, Tulane, 1910 | 1925 | 1926 |
| Weaver, William Jackson (Hon.), Pr, Asheville; Jefferson, 1898 | 1897 | 1903 |
| Weizenblatt, Sprinza, Oph, Asheville; Vienniese Univ., 1922 | 1929 | 1931 |
| White, Robert Alexander, Ob, Asheville; Univ. of Cincinnati, 1918 | 1920 | 1921 |
| Whitehead, Seba L., D, Asheville; Jefferson, 1921 | 1921 | 1929 |
| Williams, Jabez H., PH, Oteen; Jefferson, 1920 | 1920 | 1922 |
| Willims, Tom Alfred, PN, Asheville; Univ. of Edinburgh, 1896 | 1943 | 1943 |
| Willis, Arthur Ponder (Hon.), GP, Candler; Univ. of N. C., 1904 | 1904 | 1906 |
| Willis, Candler Arthur, GP&S, Candler; Duke, 1936 | 1938 | 1938 |
| Wilmerding, William Edward, GP, Skyland; Univ. of the South, 1899 | 1915 | 1915 |
| Wilson, George D., I, Asheville; Temple, 1937 | 1939 | 1946 |
| Wilson, Roeby Bryant, Anes, Asheville; Univ. of Louisville, 1931 | 1931 | 1933 |
| Wood, Hagan Emmett, T, Black Mountain; Emory, 1922 | 1938 | 1939 |
| Worley, James Harr, Asheville; Univ. of Tenn., 1931 | 1934 | 1935 |
| Wright, Frederick Starr, Asheville; P. & S., New York, 1906 | 1945 | 1945 |
| Young, John Clingman, U, Asheville; Univ. of Tenn., 1926 | 1926 | 1929 |

## BURKE COUNTY SOCIETY[9]

| | | |
|---|---|---|
| **President**: Taylor, Erasmus Hervey Evans, P, Morganton; Tulane, 1924 | 1924 | 1925 |
| **Secretary**: Reece, John C., Path, Morganton; N. Y. Univ., 1938 | 1938 | 1946 |
| Adams, R. K., P, Morganton; Jefferson, 1912 | 1912 | 1947 |
| Arney, William Charles, GP, Morganton; Univ. of Md., 1940 | 1942 | 1942 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Beall, Louis Girardeau (Hon.), NP, Morganton; N. C. Med. Coll., 1906 | 1906 | 1906 |
| Billings, Gilbert M., OALR, Morganton; Tulane, 1919 | 1919 | 1920 |
| Boehm, Emil, P, Morganton; Johns Hopkins, 1910 | 1946 | 1946 |
| Brown, Winfred Earl, P, Memphis, Tenn.; Tulane, 1939 | 1939 | 1944 |
| Collett, James R., GP, Morganton; Harvard, 1944 | 1944 | 1947 |
| Ervin, John Witherspoon, GP, Morganton; Med. Coll. of Va., 1933 | 1935 | 1936 |
| Goodwin-Barbour, Edith, GP, Morganton; Woman's Med. Coll. of Pa., 1932 | 1934 | 1934 |
| Hamer, Alfred Wilson, GP, Morganton; Med. Coll. of S. C., 1921 | 1938 | 1940 |
| Helms, Jefferson Bivins, S, Morganton; Univ. of Pa., 1928 | 1928 | 1931 |
| Hudson, Miles, GP, Valdese; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Kibler, William Herbert, ALR, Morganton; Univ. of Pa., 1914 | 1914 | 1918 |
| Kirksey, James Jackson, Pd, Morganton; Univ. of Pa., 1921 | 1921 | 1923 |
| Kirksey, William Albert, GP, Morganton; Washington Univ., 1944 | 1947 | 1947 |
| Lang, A. M., GP, Morganton; Med. Coll. of Va., 1943 | 1947 | 1947 |
| Lynn, Cy Kellie, GP, Valdese; Med. Coll. of Va., 1932 | 1933 | 1937 |
| McKee, John Sasser, Jr., P, Morganton; Univ. of Pa., 1929 | 1929 | 1936 |
| Nichols, Thomas Rogers, I, Morganton; Univ. of Rochester, 1930 | 1943 | 1943 |
| Oehlbeck, Luther William, R, Morganton; Univ. of Rochester, 1930 | 1939 | 1939 |
| Palmer, Yates Shuford, S, Valdese; Med. Coll. of Va., 1931 | 1931 | 1933 |
| Phifer, Edward W., S, Morganton; Harvard, 1937 | 1937 | 1946 |
| †Riddle, Joseph Bennett (Hon.), Morganton; Vanderbilt, 1898 | 1904 | 1904 |
| Riggs, M. M., GP, Drexel; Duke, 1943 | 1947 | 1947 |
| Sisk, Crete Nixon, PH, Morganton; Univ. of Nashville, 1905 | 1922 | 1923 |
| Stiff, A. Olin, GP, Valdese; Med. Coll. of S. C., 1944 | 1945 | 1945 |
| Taylor, John Eldredge, GP, Morganton; Med. Coll. of Va., 1922 | 1929 | 1930 |
| Vernon, James Taylor, P, Morganton; Washington Univ., 1943 | 1944 | 1946 |
| Vernon, James William (Hon.), P, Morganton; Jefferson, 1909 | 1909 | 1913 |
| Walton, Cyrus Leslie, Ob, Glen Alpine; Med. Coll. of Va., 1931 | 1931 | 1933 |

## CABARRUS COUNTY SOCIETY[10]

| | | |
|---|---|---|
| **President:** Barringer, Archie L., GP, Mt. Pleasant; Temple, 1936 | 1937 | 1944 |
| **Secretary:** Craven, Frederick Thorne, GP, Concord; New York Univ., 1938 | 1938 | 1940 |
| Adams, Fletcher Ruff, PH, Concord; Med. Coll. of S. C., 1935 | 1936 | 1942 |
| Bangle, James Alexander, GP, Concord; N. C. Med. Coll., 1916 | 1916 | 1920 |
| Barnhardt, Albert Earl, GP, Kannapolis; Univ. of Md., 1933 | 1933 | 1941 |
| Barrier, Henry Webster, PN, Concord; Chicago Med. Sch., 1921 | 1931 | 1936 |
| Brandon, Wesley Otis, GP, Concord; Med. Coll. of Va., 1928 | 1929 | 1932 |
| Brantley, Thomas H., U, Concord; Med. Coll. of S. C., 1936 | 1936 | 1939 |
| Buchanan, S. E., Concord; Univ. of Md., 1912 | 1912 | 1914 |
| Bunn, J. J., Mt. Pleasant; N. C. Med. Coll., 1912 | 1913 | 1915 |
| Burns, Joseph Eugene, Pd, Concord; Med. Coll. of Va., 1923 | 1923 | 1928 |
| Busby, Julian, GP, Kannapolis; Johns Hopkins, 1931 | 1931 | 1937 |
| Calder, Duncan Graham, Jr., S, Concord; Univ. of Pa., 1936 | 1940 | 1940 |
| Floyd, William Russel, S, Concord; Jefferson, 1929 | 1936 | 1938 |
| Hege, John Roy (Hon.), PH, Concord; Univ. of Md., 1916 | 1916 | 1917 |
| Hill, F. Burnarde, GP, Concord; Temple, 1943 | 1946 | 1947 |
| Johnston, Joseph B., Jr., I, Kannapolis; Tulane, 1940 | 1946 | 1946 |
| Ketner, Fred Yadkin, GP, Concord; Med. Coll. of Va., 1928 | 1929 | 1930 |
| King, Richard Morrison (Hon.), GP, Concord; Jefferson, 1903 | 1903 | 1906 |
| Lubchenko, Nicholas E. (Hon.), GP, Harrisburg; N. C. Med. Coll., 1915 | 1915 | 1916 |
| MacFadyen, Paul Rutherford, GP, Concord; Univ. of Va., 1929 | 1929 | 1932 |
| Maulden, Paul Ranzo, S, Kannapolis; N. Y. Univ., 1932 | 1932 | 1934 |
| Misenheimer, E. A., GP, Concord; Univ. of Md., 1926 | 1927 | 1928 |
| Monroe, Lance Truman, ObG, Kannapolis; N. Y. Univ., 1932 | 1937 | 1938 |
| Moorefield, Robert Hoyle, Kannapolis; Med. Coll. of Va., 1936 | 1936 | 1941 |
| Morris, Rae Henderson, S, Concord; Jefferson, 1929 | 1929 | 1932 |
| Nance, James Edwin, OALR, Kannapolis; Med. Coll. of Va., 1929 | 1929 | 1942 |
| Nolan, James Onslow, GP, Kannapolis; Jefferson, 1921 | 1921 | 1922 |
| Rankin, R. B., Concord; Tulane, 1917 | 1920 | 1922 |
| Smerznak, John Joseph, GP, Concord; Hahnemann Med. Sch., 1940 | 1940 | 1946 |
| Smoot, James Edward (Hon.), GP, Concord; Baltimore Med. Coll., 1893 | 1894 | 1902 |
| Swann, Joseph Fuller (Hon.), GP, Kannapolis; Coll. of P. & S., Baltimore, 1896 | 1896 | 1904 |
| Tuttle, Marler Slate, Pd Kannapolis; Temple, 1938 | 1938 | 1940 |
| Whicker, Guy Lorraine, GP, Kannapolis; Univ. of Md., 1926 | 1926 | 1928 |
| White, Estus, GP, Kannapolis; Tulane, 1926 | 1926 | 1940 |
| Widenhouse, Martin Aubrey, GP, Concord; Univ. of Cincinnati, 1925 | 1926 | 1927 |
| Wilson, Frank E., Deputy Med. Director, Red Cross, Washington, D. C.; Univ. of Tenn., 1933 | 1936 | 1936 |
| Youngblood, Vernon, GP, Concord; Emory, 1944 | 1946 | 1947 |
| Yow, Daniel Eugene, I, Concord; Temple, 1935 | 1935 | 1937 |
| Yow, Ira A. (Hon.), GP, Concord; N. C. Med. Coll., 1906 | 1906 | 1910 |

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† Deceased.

## CALDWELL COUNTY SOCIETY[11]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Kent, Alfred Abraham, Jr., GP, Granite Falls; Jefferson, 1931 | 1931 | 1934 |
| **Secretary:** Jones, Ira S., GP, Lenoir; Columbia Univ., 1943 | 1943 | 1947 |
| Blackwelder, Verne Hamilton, S, Lenoir; Univ. of Pa., 1929 | 1929 | 1931 |
| Byerly, Wesley Grimes, OALR, Lenoir; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Corpening, Oscar J. (Hon.), GP, Granite Falls; Univ. Coll. of Med., Richmond, 1906 | 1906 | 1906 |
| Corpening, William Nye, GP, Granite Falls; Univ. of Md., 1943 | 1943 | 1944 |
| Dula, Frederick Mast, S, Lenoir; Vanderbilt, 1932 | 1934 | 1934 |
| Fetner, Lawrence Merrill, R, Lenoir; N. C. Med. Coll., 1914 | 1914 | 1938 |
| Fowler, Shelton F., GP, Lenoir; Vanderbilt, 1938 | 1945 | 1946 |
| Hamer, Douglas, Jr., U, Lenoir; Med. Coll. of S. C., 1927 | 1927 | 1930 |
| Hedrick, Clyde Reitzel, C, Lenoir; Georgetown Med. Coll., 1925 | 1925 | 1926 |
| Hickman, Harry Stuart, Lenoir; Duke, 1938 | 1940 | 1942 |
| Jones, M. E., GP, Granite Falls; Duke, 1943 | 1943 | 1947 |
| Kell, Thornton, S, Lenoir; Univ. of Ga., 1937 | 1947 | 1947 |
| Kendrick, Charles Mattox, I, Lenoir; Duke, 1933 | 1939 | 1939 |
| Lore, Ralph Eli, S, Lenoir; Rush Med. Coll., 1932 | 1933 | 1937 |
| McNairy, Margaret Caroline, Ob, Lenoir; Woman's Med. Coll. of Pa., 1917 | 1917 | 1919 |
| Russell, Charles R., GP, Granite Falls; Univ. Coll. of Med., Richmond, 1909 | 1909 | 1918 |
| Templeton, Ralph, Lenoir; Duke, 1942 | 1946 | 1946 |
| Troutman, Baxter Suttles, GP, Lenoir; Univ. of Md., 1936 | 1936 | 1939 |
| Wilson, Clarence L. (Hon.), GP, Lenoir; Chattanooga Med. Coll., 1903 | 1903 | 1905 |

## CAMDEN—SEE PASQUOTANK-CAMDEN-CURRITUCK-DARE

## CARTERET COUNTY SOCIETY[12]

| | | |
|---|---|---|
| **President:** Moore, Laurie Walker, Beaufort; Med. Coll. of Va., 1931 | 1931 | 1933 |
| **Secretary:** Moore, Laurie Walker, Beaufort; Med. Coll. of Va., 1931 | 1931 | 1933 |
| Bonner, Kemp Plummer Battle (Hon.), Pd, Morehead City; Med. Coll. of Va., 1905 | 1905 | 1905 |
| Hatcher, Samuel W., GP, Morehead City; N. Y. Univ., 1942 | 1943 | 1946 |
| Hyde, Frank Edward, ObG, Beaufort; Western Reserve Univ., 1920 | 1925 | 1926 |
| Lewis, Clifford Whitfield, Beaufort; Med. Coll. of Va., 1930 | 1930 | 1931 |
| Morey, Milton B., GP&S, Morehead City; Univ. of Rochester, 1941 | 1944 | 1946 |
| Morris, John Watson, S, Morehead City; Univ. of Va., 1936 | 1938 | 1938 |
| Royal, Benjamin F. (Hon.), S, Morehead City; Jefferson, 1909 | 1909 | 1912 |
| Salter, Theodore, GP, Beaufort; Med. Coll. of S. C., 1941 | 1941 | 1946 |
| Thompson, Sanford Webb, Jr., GP, Morehead City; Med. Coll. of Va., 1913 | 1915 | 1922 |
| Way, John E., S, Beaufort; Univ. of Md., 1938 | 1938 | 1946 |

## CASWELL—SEE ALAMANCE-CASWELL

## CATAWBA COUNTY SOCIETY[13]

| | | |
|---|---|---|
| Barnes, Henry Eugene, Jr., C, Hickory; Univ. of Md., 1935 | 1935 | 1938 |
| Barringer, Phil L., GP, Hickory; Jefferson, 1942 | 1942 | 1946 |
| Caldwell, Lawrence McClure, GP, Newton; Univ. of Pa., 1932 | 1932 | 1934 |
| Cloninger, Charles Edgar, GP, Conover; Univ. of Md., 1941 | 1941 | 1943 |
| Cochrane, James Daniel, GP, Newton; Univ. of Md., 1912 | 1912 | 1923 |
| Fresh, William Maurice, OALR, Hickory; Medico-Chirurgical Coll. of Phila., 1906 | 1913 | 1919 |
| Fritz, William Abel, GP, Hickory; Temple, 1933 | 1933 | 1934 |
| Frye, Glenn Raymer, S, Hickory; Jefferson, 1921 | 1921 | 1923 |
| Gast, Charlotte Marie, Hickory; Univ. of Rochester, 1934 | 1942 | 1943 |
| Griffin, Harold Walker, OALR, Hickory; Emory, 1923 | 1931 | 1932 |
| Hambrick, Robert Theodore, Pr, Hickory; Tulane, 1923 | 1923 | 1924 |
| Jones, Frank Woodson, S, Newton; Med. Coll. of Va., 1934 | 1939 | 1940 |
| Junkin, William M., S, Hickory; Med. Coll. of Va., 1925 | 1933 | 1946 |
| Keever, James Woodfin, T, Hickory; Med. Coll. of Va., 1927 | 1927 | 1930 |
| Lewis, John Sumter, S, Hickory; Med. Coll. of S. C., 1925 | 1927 | 1932 |
| Long, Frederick Yount (Hon.), GP, Catawba; N. C. Medical Coll., 1898 | 1898 | 1904 |
| Long, Glenn (Hon.), GP, Newton; N. C. Med. Coll., 1912 | 1912 | 1915 |
| Long, Thomas Walter, GP, Newton; Emory, 1935 | 1935 | 1936 |
| MacLauchlin, W. T., GP, Conover; Med. Coll. of S. C., 1941 | 1946 | 1947 |
| †Menzies, Henry Charles (Hon.), GP, Hickory; N. C. Med. Coll., 1894 | 1894 | 1899 |
| Shuford, Jacob Harrison, GP, Hickory; Univ. of Pa., 1936 | 1936 | 1942 |
| Stewart, Daniel Niven, Jr., GP, Hickory; Univ. of Pa., 1935 | 1935 | 1938 |
| Summers, J. Dent, S, Hickory; Univ. of Pa., 1939 | 1939 | 1947 |
| Whaley, James Davant, U, Hickory; Med. Coll. of S. C., 1925 | 1927 | 1936 |
| Young, Joseph A., GP, Newton; Med. Coll. of S. C., 1938 | 1938 | 1945 |

† Deceased.

## CHATHAM COUNTY SOCIETY[14]

| Name and Address | Licensed | Joined State Society |
|---|---|---|
| **President:** Wrenn, Grover Cleveland, GP, Siler City; Med. Coll. of S. C., 1937 | 1937 | 1937 |
| **Secretary:** Mathiesen, Kenneth Marlin, GP, Pittsboro; Coll. of Med. Evangelists, 1937 | 1938 | 1939 |
| Camp, Horton, GP, Pittsboro; Northwestern Univ., 1932 | 1933 | 1935 |
| Earle, Jesse Burns, Ob, Siler City; Med. Coll. of Va., 1935 | 1935 | 1938 |
| Gibson, M. W., GP, Goldston; Med. Coll. of Va., 1925 | 1925 | 1947 |
| Patman, William Louis, S, Siler City; Harvard, 1921 | 1923 | 1926 |
| Pleasants, George D., GP, Siler City; Med. Coll. of Va., 1942 | 1942 | 1945 |

## CHEROKEE COUNTY SOCIETY[15]

| | | |
|---|---|---|
| **President:** Hoover, William Alonzo, S, Murphy; Univ. of Md., 1933 | 1933 | 1938 |
| **Secretary:** Van Gorder, Charles O., GP, Andrews; Univ. of Tenn., 1939 | 1946 | 1946 |
| †Heighway, Sheridan C. (Hon.), GP, Murphy; Med. Coll. of Ohio, 1885 | 1904 | 1898 |
| Miller, Harry, GP, Murphy; Emory, 1934 | 1936 | 1938 |
| Parrette, Nettie Coffey, GP, Robbinsville; Univ. of Tenn., 1934 | 1937 | 1941 |
| Parrette, Richard Grenville, GP, Robbinsville; Univ. of Tenn., 1934 | 1936 | 1941 |
| Plonk, George W., Murphy; Jefferson, 1944 | | |
| Rodda, John S., GP, Andrews; Univ. of Oregon, 1940 | 1946 | 1946 |
| Scruggs, William Henry, GP, Andrews; Univ. of Md., 1913 | 1915 | 1917 |
| Staton, Leon Raphael, GP, Hayesville; Univ. of Md., 1929 | 1929 | 1931 |
| Taylor, Frank Victor, OALR, Murphy; N. C. Med. Coll., 1915 | 1915 | 1936 |
| Whitfield, Bryan Watkins, GP, Murphy; Tulane, 1920 | 1934 | 1936 |

## CHOWAN-PERQUIMANS COUNTIES SOCIETY[16]

| | | |
|---|---|---|
| Brinn, Thomas Preston, GP, Hertford; Univ. of Pa., 1923 | 1923 | 1927 |
| Davenport, Carlton Alderman, GP, Hertford; Univ. of Md., 1924 | 1924 | 1926 |
| Hoggard, William Alden (Hon.), GP, Hertford; Med. Coll. of Va., 1907 | 1907 | 1910 |
| Powell, Jesse Averette (Hon.), GP, Edenton; Coll. of P. & S., Baltimore, 1907 | 1908 | 1909 |
| Vaughan, Roland Harris, GP, Edenton; Univ. of Va., 1935 | 1938 | 1939 |
| Ward, Ivie Alphonso (Hon.), OALR, Hertford; Univ. of N. C., 1907 | 1907 | 1915 |
| Whichard, Murray Parmer, PH, Edenton; Univ. of Md., 1910 | 1910 | 1918 |
| Williams, Leonidas Polk, GP, Edenton; N. Y. Univ., 1918 | 1919 | 1920 |
| Wisely, Martin Robert, GP, Edenton; Univ. of Va., 1935 | 1937 | 1938 |
| Wood, Frank, S, Edenton; Univ. of Pa., 1928 | 1931 | 1932 |
| Wood, Martha, Edenton; Univ. of Pa., 1928 | 1934 | 1935 |

## CLAY—SEE MACON-CLAY

## CLEVELAND COUNTY SOCIETY[17]

| | | |
|---|---|---|
| **President:** Sherrill, Herbert Rankin, GP, Shelby; Univ. of Tenn., 1926 | 1926 | 1927 |
| **Secretary:** Moore, Ernest Victor, Pd, Shelby; Med. Coll. of S. C., 1933 | 1933 | 1938 |
| Anthony, James Edward (Hon.), GP, Kings Mountain; Univ. of Tenn., 1911 | 1911 | 1912 |
| Bliss, Forrest Edgar, S, Lawndale; Coll. of Med. Evangelists, 1933 | 1933 | 1934 |
| Bridges, Dwight Thomas, GP, Lattimore; Emory, 1926 | 1926 | 1928 |
| Falls, Fred, GP, Shelby; Tulane, 1930 | 1930 | 1933 |
| Fleming, Fred Henry, GP, Coats; Tulane, 1930 | 1930 | 1933 |
| Gibbs, Emmett Wyattman, GP, Shelby; Univ. of N. C., 1907 | 1907 | 1918 |
| Gold, Ben, Pd, Shelby; Univ. of Md., 1920 | 1920 | 1922 |
| Hamrick, John Carl, S, Shelby; Univ. of Md., 1935 | 1935 | 1940 |
| Hamrick, Ladd Watts, Jr., Boiling Springs; Bowman Gray Sch. of Med., 1946 | 1946 | 1946 |
| Harbison, John William, S, Shelby; Johns Hopkins, 1919 | 1919 | 1924 |
| Hill, Abel LeCompte, GP, Kings Mountain; Univ. of Pa., 1930 | 1930 | 1932 |
| Holton, A. J., GP, Fallston; Univ. of Pa., 1933 | 1940 | 1942 |
| Houser, Emanuel Alvin (Hon.), GP, Shelby; Baltimore Univ., 1902 | 1902 | 1904 |
| Hunter, J. B., Shelby; Bellevue Med. Coll., 1928 | 1932 | 1947 |
| Johnson, Julius D., OALR, Shelby; Univ. of Ga., 1924 | 1930 | 1946 |
| Jones, Craig, S, Shelby; Ind. Univ., 1936 | 1937 | 1938 |
| Kendall, Benjamin Horton, GP, Shelby; Univ. of Md., 1929 | 1929 | 1931 |
| Lattimore, Everett Beam (Hon.), GP, Shelby; Bellevue Med. Coll., 1897 | 1896 | 1904 |
| Mitchell, Thomas Brice, GP, Shelby; Univ. of Pa., 1924 | 1925 | 1927 |
| Moore, D. Forrest, ObG, Shelby; Jefferson, 1925 | 1925 | 1927 |
| Padgett, Charles King, GP, Shelby; Jefferson, 1930 | 1930 | 1934 |
| Padgett, Philip Grover, Pd, Kings Mountain; Tulane, 1935 | 1936 | 1940 |
| Parker, Shepherd Falkener, GP, Shelby; Med. Coll. of Va., 1929 | 1929 | 1931 |
| Ramseur, William Lee, GP, Kings Mountain; Med. Coll. of S. C., 1926 | 1927 | 1929 |
| Royster, Stephen Sampson (Hon.), GP, Shelby; Tenn. Med. Coll., 1891 | 1896 | 1904 |
| Schenck, Sam Moore, S, Shelby; Univ. of Pa., 1923 | 1923 | 1926 |
| Thompson, Heyward Chevis, T, Shelby; Tulane, 1930 | 1931 | 1932 |
| Tilt, LeRoy W., Jr., GP, Lawndale; Univ. of Md., 1943 | 1946 | 1947 |
| Washburn, Chivous Yulan, GP, Mooresboro; Jefferson, 1937 | 1937 | 1939 |
| Washburn, Wyan, GP, Shelby; Jefferson, 1943 | 1943 | 1947 |

† Deceased.

## COLUMBUS COUNTY SOCIETY[18]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Green, William Alexander, GP, Whiteville; Northwestern, 1934 | 1935 | 1936 |
| **Secretary:** Floyd, Anderson Gayle, GP, Whiteville; Med. Coll. of S. C., 1937 | 1937 | 1939 |
| Baldwin, William E., Jr., GP, Whiteville; Duke, 1942 | 1946 | 1946 |
| Bass, R. E., GP, Chadbourn; Med. Coll. of S. C., 1945 | 1945 | 1946 |
| Black, John Riley, Jr., GP, Whiteville; Duke, 1938 | 1942 | 1943 |
| Cox, Grover Steadman (Hon.), Pd, Tabor City; N. C. Med. Coll., 1911 | 1911 | 1914 |
| Dawson, James Nelson, GP, Lake Waccamaw; Med. Coll. of Va., 1932 | 1932 | 1934 |
| Elliott, George Douglas, GP, Fair Bluff; Univ. of Pa., 1923 | 1923 | 1926 |
| Floyd, Lawrence Dowe (Hon.), GP, Fair Bluff; N. C. Med. Coll., 1911 | 1911 | 1912 |
| Howard, John Richard, ObG, Lake Waccamaw; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Johnson, Floyd (Hon.), PH, Whiteville; Memphis Hosp. Med. Coll., 1903 | 1903 | 1904 |
| Medlin, La Rue M., Tabor City; Med. Coll. of S. C., 1943 | 1946 | 1946 |
| Mickley, Jack, GP, Tabor City; Univ. of Md., 1932 | 1934 | 1937 |
| Miller, Warren Edwin, S, Whiteville; Emory, 1929 | 1934 | 1935 |
| Sadler, Ralph Calvert (Hon.), GP, Whiteville; N. C. Med. Coll., 1912 | 1912 | 1915 |
| Smith, Slade Alvah, OALR, Whiteville; N. C. Med. Coll., 1907 | 1907 | 1921 |
| Smith, William Franklin (Hon.), GP, Chadbourn; N. C. Med Coll., 1904 | 1904 | 1905 |
| Walton, George Britain, GP, Chadbourn; Tulane, 1930 | 1930 | 1935 |
| Welton, Felix Burwell, S, Whiteville; Med. Coll. of Va., 1927 | 1943 | 1944 |
| Whitaker, Richard Bidgood (Hon.), GP, Whiteville; Univ. Coll. of Med., Richmond, 1912 | 1912 | 1913 |
| Wilder, Raboteau Terrell, GP, Fair Bluff; Temple, 1941 | 1941 | 1947 |
| Williamson, Rossie Marshall, GP, Tabor City; Univ. of Pa., 1937 | 1937 | 1940 |

## CRAVEN COUNTY SOCIETY[19]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Willis, William Henry, Jr., GP, New Bern; Med. Coll. of Va., 1939 | 1939 | 1942 |
| **Secretary:** Grady, Franklin M., GP, New Bern; Syracuse Univ., 1932 | 1932 | 1934 |
| Ashford, Charles Hall, GP, New Bern; Johns Hopkins, 1927 | 1927 | 1931 |
| Barker, Christopher Sylvanus, GP, New Bern; Jefferson, 1909 | 1909 | 1924 |
| Duffy, Charles, Pd, New Bern; Jefferson, 1930 | 1930 | 1935 |
| Duffy, Richard Nixon (Hon.), S, New Bern; Johns Hopkins, 1906 | 1907 | 1908 |
| Hammond, Alfred Franklin, Jr., GP, New Bern; Jefferson, 1934 | 1934 | 1937 |
| Hollister, William, GP, New Bern; Univ. of Md., 1922 | 1922 | 1942 |
| Kafer, Oscar Adolph, GP, New Bern; Univ. of Md., 1934 | 1934 | 1937 |
| Patterson, Joseph Flanner (Hon.), S, New Bern; Jefferson, 1906 | 1906 | 1906 |
| Pollock, Raymond A. (Hon.), GP, New Bern; Jefferson, 1897 | 1900 | 1900 |
| Stevens, Alexander H., Jr., OALR, New Bern; Univ. of Ga., 1932 | 1933 | 1934 |
| Wadsworth, Harvey Bryan, GP, New Bern; Johns Hopkins, 1918 | 1918 | 1923 |
| Watson, Samuel Parks, ALR, New Bern; Univ. of Md., 1901 | 1901 | 1942 |

## CUMBERLAND COUNTY SOCIETY[20]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Farmer, William Anderson, S, Fayetteville, Vanderbilt, 1930 | 1937 | 1941 |
| **Secretary:** Snipes, Richard Dean, Ob, Fayetteville; Duke, 1942 | 1945 | 1946 |
| Allgood, Reece Alexander (Hon.), GP, Fayetteville; Univ. of Md., 1912 | 1915 | 1917 |
| Breeden, William Henry, Pd, Fayetteville; Med. Coll. of S. C., 1938 | 1941 | 1946 |
| Cogdell, David Melvin, GP, Fayetteville; Med. Coll. of Va., 1938 | 1938 | 1940 |
| Currie, Daniel Smith, Jr., OALR, Fayetteville; Jefferson, 1936 | 1936 | 1941 |
| Elfmon, Samuel Leon, I, Fayetteville; Med. Coll. of Va., 1935 | 1936 | 1937 |
| Foster, Malcolm Tennyson, PH, Fayetteville; Emory, 1927 | 1927 | 1930 |
| Greene, James Verdery, GP, Fayetteville; Univ. of Ga., 1938 | 1939 | 1940 |
| Harry, John McKamie, U, Fayetteville; Med. Coll. of Va., 1934 | 1934 | 1936 |
| Highsmith, Jacob Frank, Jr., S, Fayetteville; Univ. of Pa., 1927 | 1927 | 1929 |
| Highsmith, William Cochran, I, Fayetteville; Univ. of Cincinnati, 1931 | 1930 | 1932 |
| Kesler, Robert Cicero, OALR, Fayetteville; Tulane, 1928 | 1928 | 1930 |
| King, Robert, I, Fayetteville; George Washington Univ. Sch. of Med., 1942 | 1942 | 1947 |
| Lilly, James Marshall (Hon.), OALR, Fayetteville; Univ. Coll. of Med., Richmond, 1903 | 1903 | 1904 |
| McFadyen, Oscar Lee, Jr., I, Fayetteville; Duke, 1940 | 1941 | 1942 |
| McKay, William Peter, OALR, Fayetteville; Tulane, 1916 | 1916 | 1921 |
| McLeod, Junius Hazel, GP, Fayetteville; Med. Coll. of S. C., 1926 | 1929 | 1929 |
| Monroe, Daniel Geddie, T, Fayetteville; Jefferson, 1939 | 1939 | 1943 |
| Owen, Duncan Shaw, I, Fayetteville; Univ. of Md., 1930 | 1930 | 1933 |
| Parker, Wade Thomas, S, Fayetteville; Med. Coll. of S. C., 1928 | 1931 | 1933 |
| Pittman, Raymond Lupton (Hon.), S, Fayetteville; Jefferson, 1910 | 1910 | 1912 |
| Pittman, William Austin, OALR, Fayetteville; Temple, 1932 | 1932 | 1934 |
| Rainey, William Thomas (Hon.), I, Fayetteville; Univ. Coll. of Med., Richmond, 1913 | 1913 | 1916 |
| Reeves, James Leroy, GP, Hope Mills; Temple, 1938 | 1938 | 1942 |
| Robertson, John Newton, OALR, Fayetteville; Med. Coll. of Va., 1923 | 1923 | 1924 |
| Shaw, John Alexander, Pd, Fayetteville; Univ. of Pa., 1923 | 1923 | 1926 |
| Stutz, M. G., Ob&Pd, Fayetteville; Med. Coll. of Va., 1934 | 1934 | 1947 |
| Verdery, William Carey, Pd, Fayetteville; Univ. of Ga., 1915 | 1920 | 1921 |

## CURRITUCK—SEE PASQUOTANK-CAMDEN-CURRITUCK-DARE

## DARE—SEE PASQUOTANK-CAMDEN-CURRITUCK-DARE

## DAVIDSON COUNTY SOCIETY[21]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Lanier, Verne Clifton, GP, Welcome; Med. Coll. of Va., 1937 | 1937 | 1939 |
| **Secretary:** Terry, Jarvis Russell (Hon.), Pd, Lexington; Univ. of Louisville, 1911 | 1912 | 1912 |
| Alexander, George Thomas, GP, Thomasville; Emory, 1922 | 1933 | 1934 |
| Andrew, John Montgomery, R, Lexington; N. Y. Univ., 1932 | 1932 | 1934 |
| Block, Milton Edward, GP, Lexington; Tulane, 1933 | 1933 | 1937 |
| Cathell, Edwin Jennings, S, Lexington; Emory, 1930 | 1930 | 1932 |
| Cathell, James Luther, S, Lexington; Emory, 1937 | 1937 | 1939 |
| Clyatt, Claude Eugene, GP, Denton; Univ. of Ga., 1911 | 1923 | 1924 |
| Covington, Furman P., GP, Thomasville; Jefferson, 1939 | 1939 | 1946 |
| Craven, Jean Davidson, Pd, Lexington; Johns Hopkins, 1930 | 1933 | 1935 |
| Farrington, Joseph Allison Jackson, Thomasville; Univ. of Cincinnati, 1939 | 1939 | 1941 |
| Farrington, Reno Kirby, S, Thomasville; Univ. of Cincinnati, 1925 | 1925 | 1927 |
| Gambrell, Grover Cleveland, PH, Lexington; Univ. of Ga., 1912 | 1923 | 1924 |
| Griffis, John William, Denton; Med. Coll. of Va., 1932 | 1934 | 1937 |
| Hunt, William Bryce, GP, Lexington; Univ. of Md., 1923 | 1923 | 1924 |
| Jennings, Royal Garfield, GP, Thomasville; N. C. Med. Coll., 1913 | 1913 | 1920 |
| Leonard, Jacob Calvin, Jr., OALR, Lexington; Jefferson, 1928 | 1928 | 1931 |
| Lohr, Dermot, GP, Lexington; Jefferson, 1934 | 1934 | 1938 |
| McDonald, Robert Lacy, GP, Thomasville; Northwestern, 1936 | 1937 | 1938 |
| Mock, Frank Lowe (Hon.), GP, Lexington; N. C. Med. Coll., 1908 | 1908 | 1908 |
| Myers, Holland Thomas, Lexington; Med. Coll. of Va., 1935 | 1935 | 1940 |
| Phillips, Charles Hoover (Hon.), GP, Thomasville; Baltimore Univ. Sch. of Med., 1892 | 1893 | 1911 |
| Plummer, David Edwin, PH, Thomasville; Med. Coll. of Va., 1934 | 1934 | 1938 |
| Redwine, James Daniel, Lexington; Emory, 1931 | 1931 | 1934 |
| Sharpe, Charles Ray (Hon.), OALR, Lexington; Jefferson, 1914 | 1914 | 1917 |
| Sherrill, Phil Minnis, GP, Thomasville, Vanderbilt, 1931 | 1935 | 1937 |
| Smith, Foyle P., ObG, Lexington; Washington Univ. Sch. of Med., 1943 | 1943 | 1945 |
| Smith, J. Alexander (Hon.), S, Lexington; N. C. Med. Coll., 1915 | 1915 | 1917 |
| Smith, William Gordon, S, Thomasville; Tulane, 1927 | 1927 | 1928 |
| Vestal, Willis Jasper (Hon.), P, Lexington; Coll. of P. & S., Baltimore, 1883 | 1889 | 1893 |
| Zimmerman, Robert U. (Hon.), GP, Welcome; N. C. Med. Coll., 1901 | 1901 | 1904 |

## DAVIE—SEE ROWAN-DAVIE

## DUPLIN COUNTY SOCIETY[22]

| | | |
|---|---|---|
| **President:** | | |
| **Secretary:** Ewers, Edwin Patterson, GP, Warsaw; Med. Coll. of Va., 1935 | 1936 | 1939 |
| Farrior, James William, GP, Warsaw; Univ. of Pa., 1912 | 1913 | 1917 |
| Freeman, W. H., GP, Warsaw; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Hawes, Charles Forest, GP, Rose Hill; Northwestern, 1933 | 1932 | 1939 |
| Hoskins, William H., GP, Wallace; Med. Coll. of Va., 1931 | 1946 | 1946 |
| Hundley, Deane, Jr., GP, Wallace; Boston Med. Coll., 1934 | 1936 | 1938 |
| Hunter, John F. C., R, Magnolia; Med. Coll. of Va., 1940 | 1946 | 1946 |
| Matthews, George P., GP, Rose Hill; Temple, 1943 | 1943 | 1947 |
| Norris, Francis Loran, GP, Beaulaville; Univ. of Oklahoma, 1936 | 1937 | 1942 |
| †Quinn, Robert Franklin, GP, Magnolia; N. C. Med. Coll., 1912 | 1913 | 1916 |
| Robinson, John Daniel, GP, Wallace; Univ. of Md., 1915 | 1915 | 1917 |
| Straughan, John William, Warsaw; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Williams, James Marcus, GP, Warsaw; Univ. of Md., 1902 | 1902 | 1902 |

## DURHAM-ORANGE COUNTIES SOCIETY[23]

| | | |
|---|---|---|
| **President:** Persons, Elbert Lapsley, I, Durham; Harvard, 1927 | 1931 | 1931 |
| **Secretary:** Harris, Isaac E., Jr., S, Durham; Jefferson, 1933 | 1933 | 1939 |
| Adkins, T. F., ObG, Durham; Duke, 1936 | 1946 | 1946 |
| Alexander, Sydenham B., I, Richmond, Va.; Med. Coll. of Va., 1944 | 1944 | 1946 |
| Alyea, Edwin Pascal, U, Durham; Johns Hopkins, 1923 | 1930 | 1930 |
| Anderson, William Banks, OALR, Durham; Johns Hopkins, 1924 | 1927 | 1928 |
| Arena, Jay Morris, Pd, Durham; Duke, 1932 | 1938 | 1939 |
| Arenson, Nathan, R, Durham; N. Y. Med. Coll., 1937 | 1946 | 1947 |
| Arnold, Ralph Aranovitz, OALR, Durham; Univ. of Buffalo, 1936 | 1941 | 1941 |
| Baker, Lenox Dial, Or, Durham; Duke, 1933 | 1937 | 1937 |
| Bauer, Donald deForest, Path, Durham; McGill, 1942 | 1943 | 1943 |
| Baylin, George Jay, R, Durham; Duke, 1937 | 1941 | 1942 |
| Berryhill, Walter Reece, I&Ed, Chapel Hill; Harvard, 1927 | 1928 | 1934 |

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† Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Bitting, Numa Duncan (Hon.), S, Durham; Jefferson, 1907 | 1907 | 1909 |
| Boone, William Henry (Hon.), GP, Durham; N. C. Med. Coll., 1902 | 1902 | 1904 |
| Boone, William Waldo, GP, Durham; Jefferson, 1923 | 1923 | 1925 |
| Bowles, Francis Norman, ObG, Durham; Med. Coll. of Va., 1924 | 1924 | 1926 |
| Brinkhous, Kenneth M., Ed, Chapel Hill; Univ. of Iowa, 1932 | 1947 | 1947 |
| Brown, Ivan W., Jr., S, Durham; Duke, 1940 | 1947 | 1947 |
| Bugg, E. I., Jr., Or, Durham; Johns Hopkins, 1937 | 1946 | 1946 |
| Bullitt, James Bell (Hon.), Path, Chapel Hill; Univ. of Va., 1897 | 1914 | 1915 |
| Burwell, Walter Brodie, I, Durham; Tulane, 1941 | 1945 | 1946 |
| Callaway, Jasper Lamar, D, Durham; Duke, 1932 | 1937 | 1937 |
| Carter, Francis Bayard, ObG, Durham; Johns Hopkins, 1925 | 1925 | 1931 |
| Cekada, Emil Bogomir, I, Durham; Johns Hopkins, 1929 | 1934 | 1934 |
| Cooper, Albert Derwin, A, Durham; George Washington Univ., 1931 | 1933 | 1934 |
| Coppridge, William Maurice, U, Durham; Jefferson, 1918 | 1919 | 1920 |
| Craig, Robert Lawrence, N, Durham; Johns Hopkins, 1935 | 1939 | 1940 |
| Crane, George L., I, Durham; Cornell, 1940 | 1942 | 1947 |
| Creadick, Robert N., ObG, Durham; Yale, 1937 | 1946 | 1947 |
| Davidson, John Alexander, U, Durham; Univ. of Vt., 1942 | 1946 | 1946 |
| Davis, Clarence L.. S, Durham; Johns Hopkins, 1939 | 1942 | 1944 |
| Davison, Wilburt Cornell, Pd&Ed, Durham; Johns Hopkins, 1917 | 1927 | 1928 |
| Dees, John Essary, U, Durham; Univ. of Va., 1933 | 1940 | 1940 |
| Dees, Susan Coons. Pd, Durham; Johns Hopkins, 1935 | 1939 | 1941 |
| Dick, MacDonald, I, Durham; Johns Hopkins, 1928 | 1940 | 1941 |
| Eagle, Watt Weems, ALR, Durham; Johns Hopkins, 1925 | 1929 | 1930 |
| Easley, Eleanor Beamer, ObG, Durham; Duke, 1934 | 1940 | 1940 |
| Erickson, Cyrus Conrad, Path, Durham; Univ. of Minnesota, 1932 | 1940 | 1941 |
| Farmer, Joseph A., PN, Durham; Univ. of Chicago, 1940 | 1940 | 1946 |
| Fassett, Burton Watson (Hon.). OALR, Durham; Baltimore Med. Coll., 1898 | 1899 | 1909 |
| Ferguson, George Burton, OALR, Durham; Jefferson, 1932 | 1937 | 1938 |
| Fields, Leonard Earl, GP, Chapel Hill; Univ. of Pa., 1929 | 1929 | 1931 |
| Fleming, Ralph Gibson, GP, Durham; Univ. of Pa., 1936 | 1936 | 1938 |
| Forbus, Wiley Davis, Path, Durham; Johns Hopkins, 1923 | 1929 | 1935 |
| Forrest, Daniel Efland. GP, Hillsboro; Univ. of Md., 1930 | 1930 | 1933 |
| Fox, Frances Hill, I, Durham; Univ. of Pa., 1935 | 1940 | 1942 |
| Fox, Herbert Junius, I. Durham; Duke, 1935 | 1940 | 1941 |
| Fox, S. Frank, S, Durham; Tufts, 1940 | 1946 | 1946 |
| Gardner. Clarence Ellsworth. Jr.. S. Durham; Johns Hopkins, 1928 | 1932 | 1932 |
| Garvin, David O., PH, Chapel Hill; Med. Coll. of S. C., 1932 | 1946 | 1947 |
| Glenn, John C., Jr., R. Chelsea, Mass.; Duke, 1943 | 1947 | 1947 |
| Goddard, David W., Durham; Duke, 1939 | 1942 | 1947 |
| Goodman, E. G., I, Wilmington; Duke, 1940 | 1940 | 1945 |
| Goudge, Mabel Ensworth. P, Durham; Ohio State Univ., 1922 | 1925 | 1927 |
| Graham, John B., Path, Chapel Hill; Cornell. 1942 | 1942 | 1947 |
| Graham, William Alexander. ObG. Durham; Univ. of Pa., 1932 | 1932 | 1937 |
| Graves, Robert Williams, N, Durham; Duke, 1933 | 1937 | 1938 |
| Greenhill, Maurice Herzberger, PN, Durham; Univ. of Chicago, 1936 | 1940 | 1941 |
| Grimson, Keith Sanford, S, Durham; Rush Med. Coll., 1933 | 1942 | 1942 |
| Gunter, June U., Durham; Jefferson, 1936 | 1936 | 1947 |
| Hamblen, Edwin Crowell, I. Durham; Univ. of Va., 1928 | 1931 | 1931 |
| Hansen-Pruss, Oscar Carl Edward, I, Durham; Johns Hopkins, 1924 | 1930 | 1931 |
| Hardee, Walter Person. OALR, Durham; Jefferson, 1912 | 1912 | 1924 |
| Harris, Jerome S., Pd, Durham; Harvard, 1933 | 1940 | 1947 |
| Hart, Julian Deryl, S, Durham; Johns Hopkins, 1921 | 1929 | 1930 |
| Harton, Roman Albert, GP, Durham; Temple, 1934 | 1935 | 1936 |
| Hedgpeth. Edward McGowan, I, Chapel Hill; Univ. of Pa., 1931 | 1931 | 1934 |
| Hendrix. James Paisley. I. Durham; Univ. of Pa., 1930 | 1930 | 1939 |
| Hesser, Frederick H., P, Durham; Johns Hopkins, 1937 | 1944 | 1945 |
| Hicks, Calvin Shaw (Hon.), GP, Durham; Univ. of Md., 1904 | 1904 | 1904 |
| Hohman, Leslie B., P, Durham; Johns Hopkins, 1917 | 1946 | 1947 |
| Holloway, Joseph Clark, GP, Durham; Tulane, 1927 | 1928 | 1929 |
| Johnston, Christopher, I, Durham; Johns Hopkins, 1926 | 1930 | 1930 |
| Jones, Thomas Thweatt, D, Durham; Johns Hopkins, 1932 | 1934 | 1935 |
| Kempner, Walter, I, Durham; Univ. of Heidelberg, 1926 | 1943 | 1943 |
| Kerns, Thomas Cleveland (Hon.), OALR, Durham; Univ. of Pa., 1911 | 1911 | 1913 |
| Kos, C. M., ALR. Durham; Nebraska Med. Sch., 1937 | 1946 | 1946 |
| London, Arthur Hill, Jr., Pd, Durham; Univ. of Pa., 1927 | 1927 | 1930 |
| Lyman, Richard Sherman, P, Durham; Johns Hopkins, 1921 | 1940 | 1941 |
| MacBrayer, Lewis Burgin, III, Pd, Mooresville; Med. Coll. of S. C., 1946 | 1946 | 1946 |
| MacNider, William deBerniere (Hon.), Phar, Chapel Hill; Univ. of N. C., 1903 | 1903 | 1903 |
| Manning, Isaac Hall, Jr., I, Durham; Harvard, 1935 | 1938 | 1939 |
| Markham, Blackwell, S, Durham; Harvard, 1922 | 1922 | 1925 |
| Martin, Donald Stover, Pd, Durham; Univ. of Rochester, 1930 | 1938 | 1939 |
| McBryde, Angus Murdoch, Pd, Durham; Univ. of Pa., 1928 | 1931 | 1932 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| McCracken, Joseph Pickett, I, Durham; Duke, 1937 | 1938 | 1941 |
| McCutcheon, William Benson, S, Durham; Med. Coll. of Va., 1921 | 1921 | 1925 |
| McKee, Lewis Middleton, I, Durham; Temple, 1933 | 1934 | 1934 |
| McPherson, Samuel Dace (Hon.), OALR, Durham; Univ. of Md., 1903 | 1903 | 1904 |
| Menefee, Elijah Eugene, Jr., I, Durham; Duke, 1936 | 1940 | 1941 |
| Miale, John B., Path, Chapel Hill; Univ. of Rochester, 1940 | 1945 | 1946 |
| Morgan, William Gardner, PH, Chapel Hill; Univ. of Pa., 1931 | 1931 | 1937 |
| Nichols, Rhodes Edmond, Jr., I, Durham; Univ. of Pa., 1930 | 1930 | 1932 |
| Nicholson, William McNeal, I, Durham; Johns Hopkins, 1931 | 1935 | 1937 |
| Norton, John William Roy, PH, Chattanooga, Tenn; Vanderbilt, 1928 | 1928 | 1932 |
| Odom, Guy L., NS, Durham; Tulane, 1933 | 1943 | 1944 |
| Orgain, Edward Stewart, C, Durham; Univ. of Va., 1930 | 1934 | 1936 |
| Patterson, Fred Geer, I, Chapel Hill; Univ. of Pa., 1937 | 1937 | 1940 |
| Patterson, Hubert C., S, Durham; Harvard, 1937 | 1947 | 1947 |
| Pearse, Richard Lehmer, ObG, Durham; Harvard, 1931 | 1938 | 1938 |
| Perry, David Russell, I, Durham; Jefferson, 1919 | 1919 | 1922 |
| Pickrell, Kenneth L., S, Durham; Johns Hopkins, 1935 | 1944 | 1945 |
| Powell, Albert Henry, GP, Durham; Univ. of Ga., 1924 | 1925 | 1926 |
| Raney, Richard Beverly, Or, Durham; Harvard, 1930 | 1934 | 1935 |
| Reeves, Robert James, R, Durham; Baylor Univ., 1924 | 1930 | 1930 |
| Richards, Charles E., U, Durham; Western Reserve, 1939 | 1946 | 1946 |
| Richardson, William Perry, GP, Chapel Hill; Med. Coll. of Va., 1928 | 1928 | 1929 |
| Riggsbee, Arthur Eugene (Hon.), GP, Durham; Univ. of N. C., 1909 | 1909 | 1911 |
| Riggsbee, John B., GP, Chapel Hill; Vanderbilt, 1943 | 1946 | 1946 |
| Roberson, Foy (Hon.), S, Durham; Jefferson, 1909 | 1909 | 1912 |
| Roberts, Bennett Watson, Pd, Durham; Univ. of Md., 1924 | 1924 | 1927 |
| Roberts, Bryan Nazer, GP, Hillsboro; Univ. of Md., 1925 | 1925 | 1926 |
| Roberts, Louis Carroll, U, Durham; Duke, 1933 | 1935 | 1940 |
| Robertson, Edwin Mason, S, Durham; Tulane, 1912 | 1912 | 1929 |
| Rodwell, Eleanor, GP, Durham; Temple, 1942 | 1942 | 1944 |
| Rogers, Gaston Wilder, PH, Chapel Hill; Birmingham Med. Coll., 1911 | 1937 | 1941 |
| Ross, Robert Alexander, ObG, Durham; Univ. of Pa., 1922 | 1922 | 1926 |
| Rosser, Robert Guthrie, Jr., I, Durham; Med. Coll. of S. C., 1943 | 1943 | 1946 |
| Ruffin, Julian Meade, I, Durham; Univ. of Va., 1926 | 1930 | 1931 |
| Rundles, R. Wayne, I, Durham; Duke, 1940 | 1946 | 1946 |
| Schiebel, Herman Max, S, Durham; Johns Hopkins, 1933 | 1938 | 1940 |
| Sealey, Will C., S, Durham; Emory, 1936 | 1946 | 1947 |
| Shuler, James Edward, GP, Durham; Med. Coll. of Va., 1914 | 1920 | 1922 |
| Skinner, Benjamin S., Pd, Durham; Washington Univ., 1940 | 1940 | 1946 |
| Smith, Annie Thompson, GP, Durham; Univ. of Illinois, 1923 | 1925 | 1926 |
| Smith, David Tillerson, I, Durham; Johns Hopkins, 1922 | 1931 | 1931 |
| Smith, Erma A., I, Durham; Rush Med. Coll., 1933 | 1946 | 1947 |
| Smith, Ruby A., I, Chapel Hill; Univ. of Md., 1940 | 1942 | 1943 |
| Speas, William Paul, Jr., GP, Durham; Univ. of Pa., 1939 | 1939 | 1946 |
| Speed, Joseph Anderson (Hon.), GP, Durham; Jefferson, 1914 | 1914 | 1916 |
| Spikes, Norman Owen, GP, Durham; Jefferson, 1924 | 1924 | 1927 |
| Stanford, Lois Foote, I, Durham; Univ. of Pa., 1921 | 1923 | 1924 |
| Stanford, William Raney, I, Durham; Univ. of Pa., 1919 | 1919 | 1923 |
| Stead, Eugene A., Jr., I, Durham; Emory, 1932 | 1947 | 1947 |
| Stocker, Frederick W., Oph, Durham; Univ. of Bern, Switzerland, 1919 | 1943 | 1943 |
| Sweaney, Hunter McGuire, S, Durham; Univ. of Pa., 1919 | 1919 | 1920 |
| Thomas, Walter Lee, ObG, Durham; Univ. of Va., 1931 | 1937 | 1938 |
| Trent, Josiah Charles, S, Durham; Univ. of Pa., 1938 | 1940 | 1941 |
| Turner, Larry, OALR, Durham; Duke, 1939 | 1941 | 1947 |
| Turner, Violet H., ObG, Durham; Univ. of Chicago, 1940 | 1944 | 1945 |
| Tyler, Earl Runyon, D, Durham; Jefferson, 1923 | 1923 | 1927 |
| Vaughan, Walter Weddle, R, Durham; Jefferson, 1933 | 1933 | 1938 |
| Watkins, George Thomas, Jr. (Hon.), GP, Durham; Jefferson, 1915 | 1915 | 1917 |
| Watkins, William Merritt, GP, Durham; Jefferson, 1923 | 1923 | 1925 |
| Watson, George A., Pd, Durham; Duke, 1939 | 1939 | 1947 |
| Whilden, James Griffith, R, Durham; Duke, 1937 | 1946 | 1947 |
| Wilkins, Robert Bruce (Hon.), OALR, Durham; N. C. Med. Coll., 1913 | 1913 | 1917 |
| Wilson, James Stephenson, S, Durham; Duke, 1937 | 1947 | 1947 |
| Wise, N. Bowman, I, Durham; Yale, 1937 | 1941 | 1946 |
| Woodhall, Maurice Barnes, NS, Durham; Johns Hopkins, 1930 | 1937 | 1937 |
| Wright, John Joseph, PH, Chapel Hill; Vanderbilt, 1935 | 1940 | 1942 |

## EDGECOMBE-NASH COUNTIES SOCIETY[24]

| | | |
|---|---|---|
| **President:** Knowles, Daniel Lamont, GP, Rocky Mount; Univ. of Pa., 1918 | 1918 | 1920 |
| **Secretary:** Weeks, Kenneth Durham, I, Rocky Mount; Duke, 1939 | 1940 | 1946 |
| Anderson, Richard Speight, S, Whitakers; Univ. of Md., 1924 | 1924 | 1932 |
| Bailey, Clarence Whitfield, OALR, Rocky Mount; Jefferson, 1925 | 1925 | 1930 |
| Bass, Spencer Pippin (Hon.), GP, Tarboro; Univ. of Va., 1906 | 1907 | 1909 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Battle, Margaret White, ObG, Rocky Mount; Univ. of Mich., 1933 | 1936 | 1937 |
| Battle, Newsom Pittman, S, Rocky Mount; Univ. of Pa., 1926 | 1930 | 1931 |
| Bell, Orville Earl, GP, Rocky Mount; Oklahoma Univ., 1936 | 1937 | 1938 |
| Boice, Edmund Simpson (Hon.), S, Rocky Mount; Univ. of Pa., 1909 | 1914 | 1915 |
| Brantley, Hassell (Hon.), OALR, Spring Hope; Jefferson, 1888 | 1888 | 1901 |
| Brantley, Julian Chisholm, GP, Spring Hope; Jefferson, 1916 | 1916 | 1922 |
| Chamblee, John S., PH, Nashville; Emory, 1938 | 1938 | 1942 |
| Crumpler, James Fulton, Pd, Rocky Mount; N. Y. Univ., 1930 | 1930 | 1935 |
| Cutchin, Joseph Henry (Hon.), GP, Whitakers; Univ. Coll. of Med., Richmond, 1911 | 1911 | 1915 |
| Daughtridge, Arthur Lee, R, Rocky Mount; Univ. of Md., 1924 | 1924 | 1924 |
| Deans, Arthur Wood (Hon.), GP, Battleboro; Med. Coll. of Va., 1915 | 1915 | 1917 |
| Denton, Ausley Leo, GP, Castalia; Med. Coll. of Va., 1918 | 1921 | 1923 |
| Dixon, William Harvey, Pr, Rocky Mount; Jefferson, 1919 | 1919 | 1922 |
| Fleming, Major Ivy, R, Rocky Mount; Jefferson, 1904 | 1906 | 1919 |
| Gorham, Herbert Jenkins, GP, Nashville; Univ. of Md., 1926 | 1926 | 1927 |
| Green, William Wills (Hon.), S, Tarboro; Univ. of N. C., 1908 | 1908 | 1910 |
| Hussey, Howard S., Hosp. Res., Tarboro; Jefferson, 1942 | 1942 | 1943 |
| Jones, Millard F., GP, Rocky Mount; Temple, 1940 | 1940 | 1947 |
| Jones, William Samuel, GP, Nashville; Med. Coll. of Va., 1927 | 1927 | 1927 |
| Justa, Samuel Harry, U, Rocky Mount; Med. Coll. of Va., 1933 | 1934 | 1934 |
| Kornegay, Lemuel Weyher, Rocky Mount; Duke, 1943 | 1943 | 1943 |
| Kornegay, Robert Dumais, Or, Rocky Mount; Duke, 1939 | 1941 | 1943 |
| Lane, John Loftin (Hon.), OALR, Rocky Mount; N. C. Med. Coll., 1906 | 1906 | 1906 |
| Large, Hiram Lee, U, Rocky Mount; Med. Coll. of Va., 1917 | 1918 | 1918 |
| Looney, John Joseph Williams, OALR, Rocky Mount; Univ. of Va., 1909 | 1919 | 1919 |
| Marrow, Jane Gregory, ObG, Rocky Mount; Duke, 1943 | 1945 | 1947 |
| Martin, John Henry (Hon.), GP, Red Oak; Univ. of Nashville, 1903 | 1904 | 1916 |
| McDowell, William Kitchin, PH, Tarboro; Jefferson, 1931 | 1931 | 1934 |
| Noell, Robert Holman, GP, Rocky Mount; Univ. of Md., 1916 | 1916 | 1920 |
| Pearson, Hugh Oliver, GP, Pinetops; Med. Coll. of Va., 1926 | 1927 | 1928 |
| Perry, Ernest Monroe (Hon.), Oph, Rocky Mount; Coll. of P. & S., Baltimore, 1907 | 1907 | 1913 |
| Raby, James Grover (Hon.), Pd, Tarboro; Univ. Coll. of Med., Richmond, 1911 | 1911 | 1913 |
| Raby, William Thomas, Asst. Hosp. Res., Baltimore, Md.; Univ. of Md., 1942 | 1942 | 1943 |
| Roberson, E. L., S, Tarboro; Univ. of Md., 1934 | 1934 | 1937 |
| Robertson, Leon W., GP, Rocky Mount; Bowman Gray Sch. of Med., 1945 | 1945 | 1947 |
| Royster, Thomas Hays (Hon.), OALR, Tarboro; Univ. Coll. of Med., Richmond, 1908 | 1908 | 1914 |
| Smethie, William, S, Rocky Mount; Med. Coll. of Va., 1939 | 1946 | 1946 |
| Smith, Claiborne Thweat, I, Rocky Mount; Univ. of Pa., 1918 | 1918 | 1920 |
| Smith, Gordon, GP, Rocky Mount; Univ. of Pa., 1940 | 1943 | 1943 |
| Smith, John Goodrich, I, Rocky Mount; Duke, 1934 | 1937 | 1938 |
| Speight, James Ambler (Hon.), GP, Rocky Mount; Univ. of La., 1914 | 1915 | 1916 |
| Stone, Marvin Lee, GP, Rocky Mount; Univ. of Pa., 1924 | 1928 | 1928 |
| Sykes, Joy Verle, GP, Rocky Mount; Univ. of Pa., 1929 | 1929 | 1930 |
| Thorp, Adam Tredwell, ObG, Rocky Mount; Univ. of Pa., 1921 | 1921 | 1923 |
| Vann, Junius Richardson, GP, Spring Hope; Jefferson, 1917 | 1917 | 1920 |
| Wall, William Stanley, Ob, Rocky Mount; Univ. of Pa., 1933 | 1933 | 1936 |
| Way, Samuel Eason, S, Rocky Mount; Univ. of Md., 1933 | 1933 | 1938 |
| Whitaker, James Allen, PH, Rocky Mount; Temple, 1933 | 1934 | 1935 |
| Whitley, Robert Macon, Jr., I, Rocky Mount; Duke, 1940 | 1940 | 1943 |
| Willis, Byrd Charles (Hon.), S, Orange, Va.; Med. Coll. of Va., 1909 | 1916 | 1917 |
| Wooten, Amos Monroe, GP, Pinetops; Univ. of N. C., 1910 | 1910 | 1911 |
| Wright, John Everett, GP, Macclesfield; Jefferson, 1937 | 1937 | 1938 |

## FORSYTH COUNTY SOCIETY[25]

| | | |
|---|---|---|
| **President:** Yoder, Paul Allison, T, Winston-Salem; Univ. of Pa., 1923 | 1923 | 1925 |
| **Secretary:** Bender, John Robert, GP, Winston-Salem; Med. Coll. of Va., 1935 | 1935 | 1939 |
| Adams, Anne Stephenson, GP, Concord; Woman's Med. Coll. of Pa., 1937 | 1939 | 1940 |
| Adams, Carlton Noble, ObG, Winston-Salem; Duke, 1932 | 1936 | 1937 |
| Ader, Otis Ladeau, PH, Walkertown; Univ. of Pa., 1925 | 1925 | 1927 |
| Anderson, Katherine, Pd, Winston-Salem; Cornell, 1940 | 1943 | 1944 |
| Andrew, Lacey Allen, Jr., U, Winston-Salem; Duke, 1932 | 1932 | 1936 |
| Beavers, James Wallace, GP, Kernersville; Univ. of Pa., 1930 | 1930 | 1935 |
| Belton, Joseph Franklin (Hon.), GP, Winston-Salem; Univ. of Pa., 1914 | 1914 | 1916 |
| Benbow, Edgar Vernon, S, Winston-Salem; Jefferson, 1925 | 1925 | 1928 |
| Bowers, Marvin Arthur (Hon.), GP, Winston-Salem; Tulane, 1911 | 1911 | 1914 |
| Bradford, George Edwin, ALR, Winston-Salem; Univ. of Tenn., 1933 | 1935 | 1936 |
| Bradshaw, Howard Holt, S, Winston-Salem; Jefferson, 1927 | 1927 | 1942 |
| Brooks, Ernest Bruce, I, Winston-Salem; Duke, 1933 | 1935 | 1936 |
| Bunn, Richard Wilmot, I, Winston-Salem; Temple, 1935 | 1936 | 1937 |
| Burr, A. H., U, Winston-Salem; Coll. of P. & S., Columbia, 1934 | 1934 | 1946 |
| Butler, Leroy Jefferson, Pd, Winston-Salem; Med. Coll. of Va., 1915 | 1920 | 1921 |
| Carlton, Romulus Lee (Hon.), PH, Winston-Salem; Univ. of Md., 1906 | 1906 | 1906 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Carpenter, Coy Cornelius, Path&Ed, Winston-Salem; Syracuse Univ., 1924 | 1924 | 1927 |
| Casstevens, John Claude, GP, Winston-Salem; Med. Coll. of Va., 1926 | 1926 | 1927 |
| Cayer, David, GE, Winston-Salem; Duke, 1938 | 1944 | 1944 |
| Combs, Fielding, ALR, Winston-Salem; Med. Coll. of Va., 1923 | 1931 | 1932 |
| Conrad, Elizabeth, Pd, Winston-Salem; Johns Hopkins, 1943 | 1946 | 1946 |
| Cook, Joseph Lindsay, GP, Winston-Salem; Univ. of Pa., 1925 | 1925 | 1928 |
| Cooke, Grady Carlyle, S, Winston-Salem; Univ. of Md., 1919 | 1919 | 1920 |
| Couch, Vanderbilt Franklin, OALR, Winston-Salem; Columbia, 1911 | 1911 | 1919 |
| Cox, William Foscue, I, Winston-Salem; Med. Coll. of Va., 1942 | 1947 | 1947 |
| Craig, Sylvester Douglas (Hon.), I, Winston-Salem; Tulane, 1908 | 1911 | 1912 |
| Dalton, William Nicholson (Hon.), GP, Winston-Salem; N. C. Med. Coll., 1904 | 1904 | 1905 |
| Davis, John Preston, I, Winston-Salem; Univ. of Pa., 1934 | 1937 | 1938 |
| Davis, Thomas W. (Hon.), ALR, Winston-Salem; Med. Coll. of S. C., 1898 | 1899 | 1899 |
| Donnelly, James Ford, ObG, Winston-Salem; Univ. of Chicago, 1939 | 1941 | 1946 |
| Drummond, Charles Stitt, Pr, Winston-Salem; Univ. of Ga., 1930 | 1933 | 1933 |
| Fearrington, James Cornelius Pass, I, Winston-Salem; Rush Med. Coll., 1930 | 1933 | 1934 |
| Forsyth, H. Francis, Or, Winston-Salem; Univ. of Michigan, 1940 | 1941 | 1946 |
| Fritz, Oliver Grady, GP, Walkertown; Med. Coll. of Va., 1931 | 1932 | 1940 |
| Garvey, Fred Kesler, U, Winston-Salem; Univ. of Cincinnati, 1925 | 1925 | 1932 |
| Gilbert, Edward Lee, GP, Winston-Salem; Univ. of Tenn., 1932 | 1935 | 1936 |
| Goswick, Harry Wilson, Jr., S, Winston-Salem; Univ. of Tenn., 1931 | 1934 | 1935 |
| Griffith, Mary Irene, Ob, Winston-Salem; Univ. of Tenn., 1942 | 1942 | 1946 |
| Grimes, William Lawrence (Hon.), S, Winston-Salem; Johns Hopkins, 1910 | 1910 | 1915 |
| Hardymon, Philip, S, Winston-Salem; Vanderbilt, 1939 | 1943 | 1944 |
| Harrell, George Thomas, Jr., I, Winston-Salem; Duke, 1936 | 1940 | 1940 |
| Harrill, James Albert, ALR, Winston-Salem; Univ. of Pa., 1933 | 1935 | 1939 |
| Hart, Oliver James, U, Winston-Salem; Med. Coll. of S. C., 1925 | 1930 | 1932 |
| Hedrick, Richard E., GP, Walkertown; Med. Coll. of S. C., 1943 | 1943 | 1947 |
| Helsabeck, Belmont Augustus, GP, Winston-Salem; Med. Coll. of Va., 1931 | 1931 | 1936 |
| Helsabeck, Chester Joseph, GP, Walnut Cove; Univ. of Md., 1919 | 1919 | 1922 |
| Helsabeck, Rupert Sylvester, GP, King; N. C. Med. Coll., 1913 | 1913 | 1936 |
| Henley, Ruth Dixon, Ob, Winston-Salem; Woman's Med. Coll. of Pa., 1935 | 1937 | 1938 |
| Henley, Thomas F., Pd, Winston-Salem; Harvard, 1938 | 1943 | 1947 |
| Hightower, Felda, S, Winston-Salem; Univ. of Pa., 1933 | 1933 | 1936 |
| Holmes, George Washington, Or, Winston-Salem; Med. Coll. of Va., 1931 | 1931 | 1933 |
| Hurdle, Samuel Walker (Hon.), GP, Winston-Salem; Jefferson, 1914 | 1914 | 1915 |
| Hutaff, Lucile, I, Winston-Salem; Univ. of Rochester, 1940 | 1940 | 1945 |
| Izlar, Henry LeRoy (Hon.), GP, Winston-Salem; Med. Coll. of S. C., 1915 | 1916 | 1917 |
| Jeffreys, Everett O., NS, Winston-Salem; Washington Univ., 1934 | 1938 | 1945 |
| Johnson, Gaston Frank, R, Winston-Salem; Jefferson, 1934 | 1934 | 1938 |
| Johnson, Paul William, Ob, Winston-Salem; Univ. of Louisville, 1930 | 1932 | 1933 |
| Johnson, Wingate Memory (Hon.), I, Winston-Salem; Jefferson, 1908 | 1908 | 1910 |
| Jones, Beverly Nicholas, ALR, Winston-Salem; Med. Coll. of Va., 1915 | 1915 | 1921 |
| Jones, Beverly Nicholas, Jr., OALR, Winston-Salem; Duke, 1945 | 1945 | 1945 |
| Kapp, Constantine Hege, GP, Winston-Salem; McGill Univ., 1938 | 1938 | 1940 |
| Keiger, Oscar R. (Hon.), GP, Winston-Salem; Univ. Coll. of Med., Richmond, 1911 | 1911 | 1915 |
| Kelsey, Weston M., Pd, Winston-Salem; Johns Hopkins, 1936 | 1936 | 1946 |
| Kerr, James Edwin (Hon.), GP, Winston-Salem; Univ. of Md., 1897 | 1898 | 1898 |
| King, Edward Sandling, Pd&Bact, Winston-Salem; Jefferson, 1927 | 1927 | 1930 |
| Kirby, William Leslie, D, Winston-Salem; Vanderbilt, 1925 | 1926 | 1930 |
| Lassiter, Vernon Clark, S, Winston-Salem; Emory, 1925 | 1928 | 1929 |
| Lawson, Robert Barrett, Pd, Winston-Salem; Harvard, 1936 | 1940 | 1941 |
| Lindsay, Bert G., Jr., GP, Walnut Cove; Baylor Univ., 1946 | 1947 | 1947 |
| Lock, Frank Ray, ObG, Winston-Salem; Tulane, 1935 | 1935 | 1941 |
| Long, Vann McKee (Hon.), U, Winston-Salem; N. C. Med. Coll., 1906 | 1906 | 1908 |
| Mackie, Thomas T., I, Winston-Salem; Columbia, 1924 | 1926 | 1947 |
| MacMillan, Elbert Alexander, PN, Winston-Salem; Univ. of Pa., 1933 | 1933 | 1937 |
| Marr, James T., R, Winston-Salem; Univ. of Kansas, 1937 | 1937 | 1946 |
| Marshall, James Flournoy, S, Winston-Salem; Univ. of Pa., 1931 | 1931 | 1935 |
| Martin, Benjamin Franklin, I, Winston-Salem; Jefferson, 1936 | 1936 | 1940 |
| Martin, Lester Poindexter, OALR, Mocksville; Jefferson, 1920 | 1920 | 1921 |
| Mauzy, Charles Hampton, Jr., ObG, Winston-Salem; Univ. of Va., 1933 | 1938 | 1939 |
| McDowell, Harold Clyde, Or, Winston-Salem; Jefferson, 1931 | 1931 | 1936 |
| McMillan, Robert Lindsay, C, Winston-Salem; Duke, 1933 | 1936 | 1938 |
| McTyre, H. E., PH, Winston-Salem; Univ. of Ga., 1934 | 1945 | 1946 |
| Menzies, Henry Harding, ObG, Winston-Salem; Med. Coll. of Va., 1923 | 1923 | 1926 |
| Moore, Robert Alexander (Hon.), Or, Winston-Salem; N. C. Med. Coll., 1911 | 1911 | 1917 |
| Mordecai, Alfred, PH, Winston-Salem; Univ. of Md., 1914 | 1914 | 1945 |
| Morehead, Robert Page, Path, Winston-Salem; Jefferson, 1936 | 1936 | 1938 |
| Munt, Herbert Frederick (Hon.), Or, Winston-Salem; Med. Coll. of Va., 1911 | 1914 | 1915 |
| Nanzetta, Leonard, GP, Rural Hall; Univ. of Mich., 1942 | 1946 | 1946 |
| Norfleet, Charles Millner, Jr., U, Winston-Salem; Univ. of Pa., 1937 | 1937 | 1941 |
| Odom, Robert Taft, S, Winston-Salem; Univ. of Tenn., 1934 | 1941 | 1942 |
| Ogburn, Lundie Calvin, ObG, Winston-Salem; Jefferson, 1928 | 1928 | 1936 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| O'Neill, James Francis, S, Winston-Salem; Jefferson, 1936 | 1941 | 1942 |
| Peabody, Carroll A., GP, Winston-Salem; Western Reserve Univ., 1940 | 1940 | 1946 |
| Pegg, Fred Grant, PH, Winston-Salem; Med. Coll. of Va., 1934 | 1934 | 1936 |
| Perryman, Olin C., GP, Winston-Salem; Duke, 1941 | 1947 | 1947 |
| Pfohl, Samuel Frederick (Hon.), GP, Winston-Salem; Univ. of Pa., 1894 | 1898 | 1898 |
| Pool, Bennette Baucom, A, Winston-Salem; Jefferson, 1923 | 1923 | 1925 |
| Pool, Charles Glenn, Pd, Winston-Salem; Tulane, 1924 | 1924 | 1927 |
| Pulliam, Benjamin Eloth, GP, Winston-Salem; Jefferson, 1928 | 1928 | 1931 |
| Rankin, Samuel Wharton (Hon.), ALR, Winston-Salem; Jefferson, 1912 | 1912 | 1914 |
| Reid, Charles H., Jr., I, Winston-Salem; Duke, 1942 | 1945 | 1945 |
| Rousseau, James Parks, R, Winston-Salem; Univ. of Md., 1918 | 1920 | 1920 |
| Schallert, Paul Otto (Hon.), GP, Orlando, Fla.; Univ. of Illinois, 1904 | 1911 | 1912 |
| Selman, Joseph, R, Winston-Salem; Western Reserve Univ. Sch. of Med., 1940 | 1945 | 1945 |
| Slate, John Samuel (Hon.), GP, Winston-Salem; Univ. Coll. of Med., Richmond, 1900 | 1899 | 1904 |
| Spainhour, Ellis H. (Hon.), GP, Winston-Salem; Baltimore Med. Coll., 1898 | 1898 | 1898 |
| Speas, Dallas C., GP, Winston-Salem; Univ. of Md., 1911 | 1913 | 1924 |
| Speas, William Paul (Hon.), Oph, Winston-Salem; Univ. Coll. of Med., Richmond, 1911 | 1911 | 1912 |
| Spicer, Richard Williams (Hon.), Ob, Winston-Salem; Univ. of Pa., 1911 | 1910 | 1916 |
| Sprunt, William Hutchinson, Jr., S, Winston-Salem; Univ. of Pa., 1918 | 1918 | 1925 |
| Starling, Howard Montfort, S, Winston-Salem; Med. Coll. of Va., 1931 | 1931 | 1937 |
| Stimpson, Robert Tula, GP, Winston-Salem; Univ. of Pa., 1927 | 1927 | 1930 |
| Street, Claudius Augustus, Pd, Winston-Salem; Harvard, 1918 | 1918 | 1925 |
| Strickland, Edward F. (Hon.), GP, Winston-Salem; Univ. of N. Y., 1887 | 1887 | 1893 |
| Thomas, Wilbur Clyde, Path, Winston-Salem; Univ. of Md., 1939 | 1941 | 1942 |
| Thompson, Lloyd J., P, Winston-Salem; Washington Univ., 1919 | 1919 | 1947 |
| Tuttle, Rueben Gray (Hon.), GP, Winston-Salem; N. C. Med. Coll., 1909 | 1909 | 1913 |
| Valk, Arthur DeTalma (Hon.), S, Winston-Salem; Johns Hopkins, 1910 | 1913 | 1914 |
| Vann, Herbert Moffett, Anat, Winston-Salem; Jefferson, 1917 | 1920 | 1923 |
| Wall, Roscoe LeGrand (Hon.), Anes, Winston-Salem; Jefferson, 1912 | 1912 | 1915 |
| Welfare, Charles R., I, Winston-Salem; Univ. of Pa., 1940 | 1940 | 1947 |
| Whitaker, Richard Harper, GP, Kernersville; Univ. of Pa., 1934 | 1934 | 1939 |
| Whittington, James Benbow (Hon.), Hosp Ad, Winston-Salem; N. C. Med. Coll., 1911 | 1911 | 1911 |
| Wilsey, John D., Oph, Winston-Salem; Johns Hopkins, 1941 | 1944 | 1944 |
| Wolfe, Ralph Verlon, GP, Winston-Salem; Univ. of Indiana, 1937 | 1940 | 1941 |
| Wright, Orpheus Evans, GP, Winston-Salem; Emory, 1924 | 1924 | 1928 |
| Wyatt, Wortham (Hon.), D, Winston-Salem; Univ. of Pa., 1913 | 1913 | 1916 |
| Wylie, William deKalb, I, Winston-Salem; Univ. of Va., 1924 | 1926 | 1928 |

## FRANKLIN COUNTY SOCIETY[26]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Wheless, Thomas O., GP, Louisburg; Bowman Gray Sch. of Med., 1943 | 1943 | 1947 |
| **Secretary:** Nowell, James S., GP, Franklinton; Temple, 1943 | 1943 | 1947 |
| Bland, Charles Atlas, GP, Louisburg; Med. Coll. of Va., 1935 | 1937 | 1938 |
| Burt, Samuel Perry (Hon.), GP, Louisburg; Coll. of P. & S., Baltimore, 1896 | 1896 | 1904 |

## GASTON COUNTY SOCIETY[27]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Quickel, John Cephas, OALR, Gastonia; Univ. of Pa., 1932 | 1932 | 1936 |
| **Secretary:** Pugh, Charles Harrison (Hon.), GP, Gastonia; N. C. Med. Coll., 1910 | 1910 | 1910 |
| Anders, McTyeire Gallant (Hon.), Pd, Gastonia; Maryland Med. Coll., 1901 | 1902 | 1902 |
| Anthony, William Augustus, GP, Gastonia; Med. Coll. of Va., 1929 | 1929 | 1932 |
| Belk, George W., Gastonia; Atlanta Sch. of Med., 1913 | 1918 | 1924 |
| Blair, James Luther, ObG, Gastonia; Atlanta Med. Coll., 1915 | 1920 | 1921 |
| Blair, J. Samuel, Ob, Gastonia; Med. Coll. of S. C., 1937 | 1938 | 1940 |
| Boyce, O. D., ObG, Gastonia; Duke, 1933 | 1945 | 1946 |
| Chandler, Leon David, Gastonia; Med. Coll. of S. C., 1938 | 1940 | 1941 |
| Clinton, Roland Smith, Gastonia; Univ. of Md., 1914 | 1914 | 1920 |
| Dimmette, J. A., GP, Gastonia; Kentucky Univ., 1905 | 1906 | 1947 |
| Eckbert, William Fox, Cramerton; Duke, 1939 | 1941 | 1942 |
| Freeman, Percy L., U, Gastonia; Univ. of Ga., 1943 | 1947 | 1947 |
| Glenn, Dorothy Norman, GP, Gastonia; Woman's Med. Coll. of Pa., 1938 | 1938 | 1940 |
| Glenn, Henry Franklin, Jr., GP, Gastonia; Emory, 1932 | 1932 | 1934 |
| Glenn, Lucius Newton (Hon.), S, Gastonia; Univ. of Md., 1897 | 1897 | 1904 |
| Groves, Robert Burwell, GP, Lowell; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Herrin, Hermon Keith, Gastonia; Med. Coll. of Va., 1935 | 1936 | 1937 |
| Horsley, W. H. | | |
| Houser, Forrest Melville, GP, Cherryville; Univ. of Pa., 1928 | 1929 | 1930 |
| Howard, J. Cooper, GP, Cherryville; Temple, 1942 | 1942 | 1947 |
| Jaskunas, S. R., Gastonia | | |
| Jones, William McConnell, Pd, Gastonia; Med. Coll. of S. C., 1922 | 1927 | 1928 |
| Lyday, Charles Emmett (Hon.), GP, Gastonia; Atlanta Sch. of Med., 1910 | 1910 | 1917 |
| McAdams, Charles Rupert (Hon.), GP, Belmont; N. C. Med. Coll., 1912 | 1912 | 1916 |
| McChesney, William Wallace, Ob, Gastonia; Med. Coll. of Va., 1915 | 1926 | 1927 |
| McConnell, Harvey Russell, S, Gastonia; Univ. of Md., 1924 | 1927 | 1930 |
| McDowell, Roy Hendrix, PH, Belmont; Univ. of Md., 1929 | 1930 | 1931 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Miller, Robert Carlyle, Gastonia; N. C. Med. Coll., 1909 | 1918 | 1919 |
| Mitchell, Robert Hartwell, Gastonia; Med. Coll. of Va., 1936 | 1936 | 1938 |
| Norman, J. Standing, OALR, Gastonia; Coll. of P. & S., Baltimore, 1909 | 1911 | 1920 |
| Parks, Walter Beatty, Ind, Gastonia; Univ. of Md., 1924 | 1924 | 1927 |
| Pettit, H. S., R, Gastonia; Northwestern, 1939 | 1947 | 1947 |
| Powell, Herman Sutton, GP, Gastonia; Univ. of Va., 1932 | 1932 | 1937 |
| Reid, James William (Hon.), GP, Lowell; Jefferson, 1908 | 1908 | 1909 |
| Rhyne, Robert Edgar (Hon.), PH, Gastonia; N. C. Med. Coll., 1907 | 1907 | 1908 |
| Roberts, William McKinley, Or, Gastonia; Tufts, 1925 | 1928 | 1929 |
| Robinson, James Lee, S, Gastonia; Univ. of Pa., 1932 | 1932 | 1936 |
| Stroupe, Albertus Ula, Jr., Mount Holly; Med. Coll. of Va., 1931 | 1932 | 1938 |
| Taylor, Benjamin Cicero, GP, Mount Holly; N. C. Med. Coll., 1910 | 1911 | 1923 |
| Weathers, Bailey Graham, GP, Stanley; Med. Coll. of Va., 1929 | 1929 | 1941 |
| Wilkins, Samuel A., Sr. (Hon.), GP, Dallas; Univ. of Ky., 1902 | 1903 | 1903 |

### GATES COUNTY SOCIETY[28]

| | | |
|---|---|---|
| Blanchard, Thomas W., GP, Hobbsville; Med. Coll. of Va., 1911 | 1911 | 1919 |
| Cleveland, Parish Bowman, GP, Gatesville; Univ. of Louisville, 1943 | 1947 | 1947 |
| Payne, John Abb, III, Sunbury; Med. Coll. of Va., 1933 | 1935 | 1942 |

### GRAHAM COUNTY SOCIETY

### GRANVILLE COUNTY SOCIETY[29]

| | | |
|---|---|---|
| **President:** Daniel, L. Sam, GP, Oxford; Univ. of Md., 1940 | 1940 | 1946 |
| **Secretary:** Carrington, Samuel Macon, S, Oxford; Rush Med. Coll., 1931 | 1931 | 1934 |
| Bradsher, James Sidney, I, Stovall; Univ. of Va., 1925 | 1925 | 1928 |
| Clay, Earl Lewis, I, Oxford; Univ. of Ky., 1929 | 1929 | 1933 |
| Elliott, Julian Carr, S, Oxford; Univ. of Md., 1926 | 1926 | 1929 |
| Morris, Joseph A. (Hon.), GP, Franklinton; Vanderbilt, 1890 | 1893 | 1899 |
| Noblin, Roy Lee, GP, Oxford; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Norwood, Ballard, Jr., PH, Oxford; Med. Coll. of Va., 1937 | 1937 | 1940 |
| Taylor, Rives Williams, GP, Oxford; Tulane, 1926 | 1926 | 1928 |
| Taylor, William Louis (Hon.), GP, Oxford, Univ. of Va., 1900 | 1901 | 1901 |
| Thomas, William Nelson (Hon.), S, Oxford; Med. Coll. of Va., 1911 | 1911 | 1914 |
| Thompson, Joseph W. (Hon.), GP, Creedmoor; Univ. of Ky., 1904 | 1907 | 1917 |
| Winston, Patrick Henry, GP, Clarksville, Va.; Med. Coll. of Va., 1929 | 1929 | 1930 |

### GREENE COUNTY SOCIETY[30]

| | | |
|---|---|---|
| Dawson, William Earl, GP, Stantonsburg; Jefferson, 1920 | 1920 | 1922 |
| Harper, James Henry, (Hon.), Pd, Snow Hill; Jefferson, 1905 | 1906 | 1906 |
| Marlowe, William Anderson, GP, Walstonburg; Jefferson, 1919 | 1919 | 1921 |
| Walker, Robert Jeffreys, Jr., GP, Snow Hill; Med. Coll. of Va., 1932 | 1934 | 1935 |

### GUILFORD COUNTY SOCIETY[31]

| | | |
|---|---|---|
| **President:** Keith, Marion Yates, Pd, Greensboro; Univ. of Md., 1923 | 1923 | 1927 |
| **Secretary:** Benton, Wayne Jefferson, GP, Greensboro; Syracuse Univ., 1934 | 1934 | 1936 |
| Allgood, John W., I, Greensboro; Emory, 1938 | 1946 | 1946 |
| Antonakos, Theodore, S, Greensboro; Univ. of Ga., 1935 | 1936 | 1946 |
| Apple, Elbert Dwight, R, Greensboro; Washington Univ., 1929 | 1929 | 1936 |
| Bain, Eugene A., PH, Greensboro; Univ. of Va., 1927 | 1927 | 1939 |
| Banner, Charles Whitlock (Hon.), OALR, Greensboro; Univ. of Md., 1899 | 1899 | 1901 |
| Barefoot, Sherwood W., Greensboro; Duke, 1938 | 1946 | 1947 |
| Beall, Lawrence Lincoln, S, Greensboro; Med. Coll. of Va., 1931 | 1931 | 1946 |
| Beaver, Charles L., S, Greensboro; Med. Coll. of Va., 1931 | 1931 | 1946 |
| Beavers, William Olive, Greensboro; Northwestern Univ., 1943 | 1944 | 1946 |
| Bird, Ignacio, Greensboro; Yale, 1930 | 1946 | 1947 |
| Bonner, Merle Dumont, T, Jamestown; Univ. of Md., 1930 | 1930 | 1934 |
| Bonner, Octavius Blanchard, OALR, High Point; Univ. of Md., 1917 | 1920 | 1922 |
| Brandon, James Robert, High Point; Med. Coll. of Va., 1942 | 1942 | 1947 |
| Brockmann, Harry Lyndon, S, High Point; Univ. of Pa., 1917 | 1917 | 1921 |
| Brown, Frank Reid, I, Greensboro; Vanderbilt, 1938 | 1946 | 1946 |
| Buie, Roderick Mark, PH, Greensboro; Jefferson, 1914 | 1914 | 1917 |
| Burwell, John Cole, Jr., ObG, Greensboro; Duke, 1933 | 1936 | 1937 |
| Cardwell, D. Willard, I, Greensboro; Med. Coll. of Va., 1932 | 1936 | 1937 |
| Cater, Clinton Duncan, Ob, Greensboro; Emory, 1920 | 1923 | 1924 |
| Clary, William Thomas, ObG, Greensboro; Univ. of Pa., 1928 | 1928 | 1934 |
| Cole, Walter Francis (Hon.), Or, Greensboro; Johns Hopkins, 1909 | 1909 | 1910 |
| Collings, Ruth Mary, GP, Greensboro; Univ. of Pa., 1923 | 1926 | 1927 |
| Cook, Henry Lilly, Jr., OALR, Greensboro; Jefferson, 1918 | 1918 | 1920 |
| Cozart, Samuel Rogers, GP, Greensboro; Med. Coll. of Va., 1923 | 1923 | 1925 |

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|---|---|---|
| Creech, Lemuel Underwood, GP, High Point; Tulane, 1939 | 1939 | 1940 |
| Croom, A. B., GP, High Point; Med. Coll. of Va., 1940 | 1946 | 1946 |
| Dalton, William B., GP, Greensboro; Univ. of Md., 1918 | 1939 | 1942 |
| Davis, Joseph F. (Hon.), GP, Greensboro; Med. Coll. of Va., 1912 | 1912 | 1914 |
| Davis, Philip Bibb, GP, High Point; Jefferson, 1926 | 1926 | 1929 |
| Davis, Richard Boyd (Hon.), S, Greensboro; Med. Coll. of Va., 1915 | 1916 | 1917 |
| Dees, Ralph Erastus (Hon.), GP, Greensboro; Univ. of Md., 1906 | 1908 | 1909 |
| Dees, Rigdon Osmund (Hon.), GP, Greensboro; Univ. of Md., 1906 | 1907 | 1907 |
| Dunn, Richard Berry, ObG, Greensboro; McGill Univ., 1933 | 1936 | 1937 |
| Durham, Carey Winston, GP, Greensboro; George Washington Univ., 1927 | 1927 | 1930 |
| Dyer, John Wesley, GP, High Point; Univ. of Louisville, 1916 | 1921 | 1921 |
| Edwards, Vertie Edward (Hon.), GP, Greensboro; Univ. of Md., 1913 | 1913 | 1913 |
| Ellis, Elizabeth Lange, GP, Greensboro; Univ. of Mich., 1928 | 1942 | 1944 |
| Ellis, Ralph V., A&I, Greensboro; Nat. Univ. Arts & Sc., 1916; Univ. of Minn., 1934 | 1942 | 1944 |
| Farmer, William Dempsey, OALR, Greensboro; Duke, 1934 | 1939 | 1939 |
| Flagge, Philip Wesley (Hon.), I, Fair Hope, Ala.; Washington Univ., 1902 | 1905 | 1906 |
| Flythe, William Henry, GP, High Point; Vanderbilt, 1933 | 1933 | 1937 |
| Fortune, Alexander Fletcher (Hon.), GP, Greensboro; Univ. Coll. of Med., Richmond, 1900 | 1900 | 1904 |
| Fortune, Benjamin Fletcher, Greensboro; Jefferson, 1941 | 1941 | 1947 |
| Fox, Norman Albright, GP, Greensboro; Univ. of Pa., 1924 | 1924 | 1926 |
| Freedman, Arthur, I, Greensboro; Vanderbilt, 1939 | 1946 | 1946 |
| Geddie, Kenneth Baxter, Pd, High Point; Jefferson, 1921 | 1921 | 1923 |
| Gilmore, Clyde Manly, I, Greensboro; Med. Coll. of Va., 1925 | 1925 | 1926 |
| Gove, Anna M. (Hon.), GP, Greensboro; Woman's Med. Coll. of N. Y., 1892 | 1894 | 1896 |
| Gray, Cyrus Leighton, R, High Point; Duke, 1937 | 1937 | 1940 |
| Grayson, Charles Shober (Hon.), Ob, High Point; George Washington Univ., 1906 | 1907 | 1908 |
| Groome, James Gordon, GP, High Point; Univ. of Cincinnati, 1924 | 1924 | 1925 |
| Harden, Robert Norman, S, Greensboro; Univ. of Pa., 1922 | 1922 | 1924 |
| Harder, Frank Kirby, PH, Greensboro; Univ. of Cinn., 1930 | 1942 | 1943 |
| Harrill, Henry Clay, U, Greensboro; Johns Hopkins, 1933 | 1933 | 1940 |
| Harrison, Edmund (Hon.), GP, Greensboro; Univ. Coll. of Med., Richmond, 1896 | 1900 | 1900 |
| Harvey, Wallace Watson, GP, Greensboro; Emory, 1920 | 1922 | 1923 |
| Heffner, B. L., I, Greensboro; Northwestern, 1936 | 1938 | 1947 |
| Henson, Thomas Albert, Greensboro; Temple, 1937 | 1937 | 1947 |
| Herring, Robert Alexander, PH, High Point; Tulane, 1905 | 1923 | 1924 |
| Holt, Duncan Waldo, GP, Greensboro; Jefferson, 1918 | 1918 | 1921 |
| Jackson, Walter Leo (Hon.), S, High Point; N. C. Med. Coll., 1911 | 1911 | 1913 |
| Lackey, Marvin Alphonso, OALR, High Point; N. C. Med. Coll., 1917 | 1923 | 1924 |
| Leath, MacLean Bacon, OALR, High Point; Jefferson, 1933 | 1933 | 1937 |
| LeBauer, Maurice Leon, S, Greensboro; Univ. of Va., 1929 | 1930 | 1932 |
| LeBauer, Sidney Ferring, I, Greensboro; Univ. of Va., 1929 | 1930 | 1932 |
| Lennon, Hershel Clanton, Path, Greensboro; Univ. of Pa., 1931 | 1931 | 1941 |
| Lewis, Walter Glenn, GP, Gibsonville; Med. Coll. of Va., 1938 | 1938 | 1940 |
| Little, Howard L., GP, Gibsonville; Washington Univ., 1934 | 1934 | 1937 |
| Lovelace, Daniel D., A, Greensboro; Tufts, 1934 | 1934 | 1947 |
| Lyday, Russell Osborne, S, Greensboro; Univ. of Pa., 1920 | 1920 | 1927 |
| Lyon, Brockton Reynolds, GP, Greensboro; Columbia, 1915 | 1920 | 1920 |
| Maness, Archibald Kelly, GP, Greensboro; Jefferson, 1928 | 1928 | 1929 |
| Mann, Ira Thurman (Hon.), GP, High Point; Jefferson, 1912 | 1912 | 1915 |
| Mathews, Robert William, I, Greensboro; Emory, 1932 | 1937 | 1938 |
| McAlister, Jean Colvin, Pd, Greensboro; Univ. of Pa., 1933 | 1936 | 1937 |
| McAnally, William Jefferson (Hon.), GP, High Point; Baltimore Med. Coll., 1897 | 1896 | 1899 |
| McCain, Walkup Kennard, GP, High Point; Jefferson, 1929 | 1929 | 1930 |
| McCain, William R. (Hon.), GP, High Point; Univ. of Md., 1897 | 1898 | 1898 |
| McGee, Julian Murrill, GP, Greensboro; Univ. of Pa., 1925 | 1927 | 1928 |
| Merritt, Jesse Fred, GP, Greensboro; Northwestern, 1936 | 1937 | 1938 |
| Miles, May Sallie (Hon.), GP, Greensboro; Laura Memorial Woman's Med. Coll., Cincinnati, 1898 | 1904 | 1905 |
| Mills, Charles Rose, Oph, Greensboro; Univ. of Pittsburgh, 1936 | 1938 | 1938 |
| Morse, Seymour, High Point; Long Island, 1942 | 1942 | 1947 |
| Norment, William Blount, S, Greensboro; Jefferson, 1922 | 1922 | 1932 |
| Ogburn, Herbert Hammond (Hon.), S, Greensboro; Johns Hopkins, 1913 | 1913 | 1914 |
| Ownbey, Arthur Dennis, GP, Greensboro; Med. Coll. of Va., 1920 | 1925 | 1927 |
| Parker, Herman Richard, GP, Greensboro; Syracuse Univ., 1923 | 1924 | 1925 |
| Parks, Williams Craig, GP, High Point; Med. Coll. of S. C., 1938 | 1938 | 1940 |
| Patterson, Fred Marion, U, Greensboro; Univ. of Pa., 1924 | 1924 | 1928 |
| Perry, Glenn Grey, GP, High Point; Med. Coll. of Va., 1933 | 1933 | 1934 |
| Pipes, David McKowen, A, Greensboro; Tulane, 1934 | 1939 | 1940 |
| Prefontaine, J. Edouard, OALR, Greensboro; Laval Univ. of Quebec, 1927 | 1931 | 1934 |
| Ravenel, Samuel Fitzsimons, Pd, Greensboro; Johns Hopkins, 1923 | 1923 | 1926 |
| †Reaves, William Perry (Hon.), OALR, Greensboro; Univ. of the South, 1903 | 1905 | 1907 |
| Reavis, Charles William, Greensboro; Med. Coll. of Va., 1936 | 1936 | |

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† Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Register, John Francis, Or, Greensboro; S. C. Med. Coll., 1931 | 1936 | 1937 |
| Reitzel, Claude Everett (Hon.), GP, High Point; Coll. of P. & S., Atlanta, 1902 | 1902 | 1902 |
| Rhudy, Booker Ephram, R, Greensboro; Med. Coll. of Va., 1916 | 1926 | 1927 |
| Ridge, Clyde Franklin, High Point; Med. Coll. of Va., 1922 | 1922 | 1946 |
| Riner, C. R., GP, Greensboro; Univ. of the South, 1901 | 1944 | 1946 |
| Rubin, Adrian Stevens, Pd, Greensboro; N. Y. Med. Coll., 1937 | 1937 | 1941 |
| Saunders, Stanley Stewart, Pd, High Point; Harvard, 1924 | 1926 | 1927 |
| Sensenbach, Charles Willis, I, High Point; Harvard, 1939 | 1944 | 1944 |
| Sharp, Oliver Ledbetter, I, Greensboro; Jefferson, 1922 | 1924 | 1925 |
| Sharpe, Frank Alexander, ObG, Greensboro; Univ. of Pa., 1916 | 1916 | 1920 |
| Shelburne, Palmer Augustine, I, Greensboro; Univ. of Va., 1927 | 1928 | 1928 |
| Shepard, Karl, High Point; Harvard, 1935 | 1939 | 1940 |
| Shohan, Joseph, R, Greensboro; Coll. of P. & S., Baltimore, 1901 | 1914 | 1923 |
| Sikes, Charles Henry, GP, Greensboro; Jefferson, 1931 | 1933 | 1934 |
| Siske, Grady Cornell, GP, Pleasant Garden; Chicago Med. Coll., 1936 | 1937 | 1938 |
| Slate, John William, GP, High Point; Univ. Coll. of Med., Richmond, 1900 | 1899 | 1925 |
| Slate, Joseph Esmond, GP, High Point; Tulane, 1934 | 1934 | 1937 |
| Slate, Marvin Longworth, GP, High Point; Univ. of Md., 1931 | 1931 | 1934 |
| Smith, Alick Thomas (Hon.), GP, Greensboro; Med. Coll. of Va., 1908 | 1910 | 1913 |
| Smith, Opie Norris, I, Greensboro; Univ. of Pa., 1933 | 1938 | 1938 |
| Smith, Roy Meadows, Pd, Greensboro; Univ. of Pa., 1934 | 1934 | 1937 |
| Sparrow, Harry Ward, Greensboro; Northwestern, 1943 | 1944 | 1947 |
| Stanton, T. M. (Hon.), High Point; Med. Coll. of Va., 1916 | 1916 | 1917 |
| Starr, Henry Frank (Hon.), Ins, Greensboro; Jefferson, 1916 | 1916 | 1917 |
| Stelling, Richard Nunnally, GP, Greensboro; Univ. of Ga., 1930 | 1933 | 1934 |
| Stevens, Anna O., Student Health, Greensboro; Med. Coll. of Pa., 1936 | 1945 | 1946 |
| Stevens, Joseph Blackburn, N&I, Greensboro; Duke, 1935 | 1940 | 1940 |
| Stirewalt, Neale Summers, GP, High Point; Univ. of Md., 1909 | 1915 | 1927 |
| Strickland, Horace Gilmore, OALR, Greensboro; Univ. of Md., 1930 | 1930 | 1937 |
| Sumner, Emmett Ashworth, S, High Point; Baylor Univ., 1925 | 1926 | 1927 |
| Tankersley, James William (Hon.), S, Greensboro; Jefferson, 1906 | 1906 | 1906 |
| Tannenbaum, Abraham Jack, I, Greensboro; Duke, 1935 | 1937 | 1940 |
| Taylor, Frederick Raymond (Hon.), I, High Point; Univ. of Pa., 1913 | 1913 | 1915 |
| Taylor, James Nathaniel (Hon.), I, Greensboro; Med. Coll. of Va., 1901 | 1902 | 1905 |
| Taylor, Shahane Richardson, OALR, Greensboro; Univ. of Pa., 1921 | 1921 | 1924 |
| Taylor, Wesley Ewing, PN, Greensboro; Univ. of Mich., 1899 | 1925 | 1926 |
| Thompson, Claude Durant (Hon.), GP, High Point; Univ. of Tenn., 1901 | 1901 | 1904 |
| Tice, Walter Thomas, GP, High Point; Jefferson, 1927 | 1927 | 1929 |
| Tyson, Thomas David, Jr., Pd, High Point; Johns Hopkins, 1933 | 1933 | 1938 |
| Tyson, Woodrow Wilson, I, High Point; Med. Coll. of Va., 1935 | 1935 | 1938 |
| Vaughan, Edwin Warner, A&I, Greensboro; Univ. of Va., 1937 | 1940 | 1940 |
| Warwick, Hight Claudius, Anes, Greensboro; Med. Coll. of Va., 1934 | 1934 | 1936 |
| Watson, Hugh Alfred, GP, Greensboro; Med. Coll. of Va., 1930 | 1930 | 1941 |
| Whitehill, L. A., I, High Point; N. Y. Univ., 1935 | 1945 | 1946 |
| Whittington, Claude Thomas, S, Greensboro; Univ. of Md., 1927 | 1927 | 1929 |
| Wilkinson, Louis Lee, GP, High Point; Univ. of Va., 1926 | 1941 | 1941 |
| Williams, John Drewey (Hon.), GP, Guilford Station; Vanderbilt, 1898 | 1898 | 1898 |
| Williams, John Dudley, Jr., GP, Greensboro; Temple, 1930 | 1931 | 1935 |
| Wolfe, Hugh Claibourne, OALR, Greensboro; Med. Coll. of Va., 1917 | 1917 | 1920 |
| Womble, William Hugh, Jr., Greensboro; Med. Coll. of Va., 1943 | 1944 | 1947 |
| Wood, George Thomas, S, High Point; Jefferson, 1928 | 1928 | 1935 |
| Wood, William Reed, Greensboro; Univ. of Louisville, 1938 | 1938 | 1947 |
| Woodruff, Fred Gwyn, GP, High Point; Med. Coll. of Va., 1917 | 1917 | 1919 |
| York, Alexander Arthur (Hon.), GP, High Point; Chattanooga Med. Coll., 1907 | 1907 | 1908 |

## HALIFAX COUNTY SOCIETY[32]

| | | |
|---|---|---|
| **President:** Taylor, Thomas Jefferson, Roanoke Rapids; Jefferson, 1934 | 1934 | 1937 |
| **Secretary:** Broun, Matthew Singleton, OALR, Roanoke Rapids; Columbia, 1919 | 1922 | 1922 |
| Beckwith, Robert Payne (Hon.), Pd, Roanoke Rapids; Univ. of Pa., 1911 | 1913 | 1916 |
| Blowe, Ralph Boyd, GP, Weldon; Med. Coll. of Va., 1938 | 1938 | 1941 |
| Covington, John Malloy Clayton, OALR, Roanoke Rapids; Univ. of Va., 1929 | 1930 | 1933 |
| Cutchin, Joseph Henry, Jr., GP, Roanoke Rapids; Duke, 1942 | 1943 | 1943 |
| Fowlkes, W. M., Jr., GP, Enfield; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Hall, William Dewey, P, Roanoke Rapids; Med. Coll. of S. C., 1932 | 1933 | 1934 |
| Jarman, Fontaine Graham (Hon.), S, Roanoke Rapids; Univ. Coll. of Med., Richmond, 1911 | 1914 | 1916 |
| Joyner, Powell Winfred, GP, Enfield; Syracuse Univ., 1932 | 1932 | 1935 |
| Kroncke, Fred George, I, Roanoke Rapids; Univ. of Wisconsin, 1937 | 1941 | 1942 |
| Maddrey, Milner Crocker, S, Roanoke Rapids; Jefferson, 1931 | 1931 | 1937 |
| Neville, Cecil Howell, GP, Scotland Neck; Tulane, 1927 | 1927 | 1928 |
| Palmer, Horace, GP, Littleton; Atlanta Sch. of Med., 1912 | 1912 | 1920 |
| Robertson, Carroll Bracey, Jackson; Med. Coll. of Va., 1933 | 1934 | 1938 |
| Smith, Edward Barney, GP, Enfield; Univ. of Va., 1939 | 1940 | 1940 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Smith, Oscar Fennell (Hon.), GP, Scotland Neck; Univ. Coll. of Med., Richmond, 1899 | 1899 | 1905 |
| Suiter, Wester Ghio, GP, Weldon; Med. Coll. of Va., 1917 | 1917 | 1920 |
| Thigpen, Harry Gordon, GP, Scotland Neck; Jefferson, 1917 | 1917 | 1920 |
| Weathers, Bahnson, S, Roanoke Rapids; Washington Univ., 1917 | 1921 | 1922 |
| White, Francis Willard Moody, GP, Halifax; Med. Coll. of Va., 1924 | 1924 | 1924 |
| Woodburn, C. H., PH, Littleton; Med. Coll. of Va., 1940 | 1940 | 1944 |
| Young, Robert Foster, PH, Halifax; Emory, 1937 | 1939 | 1940 |

## HARNETT COUNTY SOCIETY[33]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Doffermyre, Luther Randolph, GP, Dunn; Temple, 1938 | 1938 | 1939 |
| **Secretary:** Hunter, William Blair, PH, Lillington; Univ. of Pa., 1911 | 1913 | 1920 |
| Adair, William Edward, GP, Erwin; Temple, 1938 | 1938 | 1941 |
| Byrd, Charles W., GP, Dunn; Temple, 1940 | 1940 | 1947 |
| Corbett, Clarence Lee, GP, Dunn; Emory, 1927 | 1927 | 1928 |
| Eldridge, Harvey A., GP, Dunn; Med. Coll. of Va., 1934 | 1934 | 1936 |
| Griffin, Leslie W., GP, Erwin; Jefferson, 1941 | 1941 | 1946 |
| Holt, William Preston (Hon.), S, Erwin; Jefferson, 1895 | 1895 | 1901 |
| Johnson, John Ralph, GP, Dunn; Med. Coll. of Va., 1932 | 1932 | 1941 |
| Martin, John Floyd (Hon.), OALR, Dunn; N. C. Med. Coll., 1905 | 1905 | 1908 |
| Parker, Paul Godwin (Hon.), GP, Erwin; Med. Coll. of Va., 1916 | 1916 | 1917 |
| Peede, Alvin Wortham, GP, Lillington; Jefferson, 1930 | 1930 | 1933 |
| Poole, Marvin Bailey, Dunn; Med. Coll. of Va., 1938 | 1938 | 1941 |
| Stanfield, William Wesley, S, Dunn; Med. Coll. of Va., 1932 | 1932 | 1940 |
| Wilson, Stephen Glenn, Angier; Med. Coll. of Va., 1930 | 1930 | 1932 |
| Wyatt, Arthur Thomas, Raleigh; Jefferson, 1919 | 1919 | 1927 |

## HAYWOOD COUNTY SOCIETY[34]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Reeves, Jerome Lyda, GP, Canton; Vanderbilt, 1913 | 1913 | 1917 |
| **Secretary:** Duckett, Virgil Howard, GP, Canton; Univ. of Pa., 1930 | 1930 | 1932 |
| Gibbons, George W., GP, Canton; Univ. of Arkansas, 1945 | 1947 | 1947 |
| Kirkpatrick, William L. (Hon.), GP, Waynesville; Vanderbilt, 1894 | 1894 | 1895 |
| Lancaster, Newton Paris, GP, Waynesville; Med. Coll. of Va., 1931 | 1932 | 1933 |
| Matthews, Hugh Archie, Canton; Duke, 1943 | 1947 | 1947 |
| McCracken, John Rufus (Hon.), OALR, Waynesville; N. C. Med. Coll., 1902 | 1902 | 1903 |
| Michal, Mary Barrows Harris, Pd, Waynesville; Yale, 1928 | 1938 | 1939 |
| Moore, Roy Hardin, GP, Canton; Washington Univ., 1931 | 1931 | 1934 |
| Owen, Charles Fletcher, Jr., S, Canton; Univ. of Pa., 1937 | 1937 | 1940 |
| Owen, Margaret Lineberry, G, Canton; Univ. of Pa., 1932 | 1932 | 1936 |
| Owen, Robert Harrison, S, Canton; Univ. of Pa., 1931 | 1931 | 1935 |
| Owen, W. Boyd, GP, Waynesville; Univ. of Pa., 1942 | 1942 | 1946 |
| Pate, James Frank, GP, Canton; Med. Coll. of S. C., 1927 | 1927 | 1929 |
| Roberson, Robert Stuart, GP, Waynesville; Med. Coll. of Va., 1930 | 1930 | 1932 |
| Russell, Jesse Milton (Hon.), Pd, Canton; Univ. of Nashville, 1911 | 1911 | 1912 |
| Stretcher, Robert Hatfield, S, Waynesville; Rush Med. Coll., 1927 | 1927 | 1930 |
| Stringfield, Samuel Lanier (Hon.), S, Waynesville; Jefferson, 1905 | 1905 | 1906 |
| Stringfield, Thomas, Sr. (Hon.), Anes, Waynesville; Vanderbilt Univ., 1898 | 1898 | 1899 |
| Stringfield, Thomas, GP, Waynesville; Univ. of S. C., 1934 | 1934 | 1937 |
| Westmoreland, Joseph Robert, GP, Canton; Washington Univ., 1932 | 1932 | 1934 |

## HENDERSON COUNTY SOCIETY[35]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** McDonald, Lester Bowman, GP, Hendersonville; Jefferson, 1934 | 1934 | 1935 |
| **Secretary:** Bond, George F., GP, Chimney Rock; McGill Univ., 1945 | 1946 | 1946 |
| Brackett, William Ernest, OALR, Hendersonville; Jefferson, 1915 | 1915 | 1924 |
| Brown, James Stevens, Sr. (Hon.), GP, Hendersonville; Northwestern, 1893 | 1894 | 1895 |
| Corpening, Flave Hart, GP, Horse Shoe; Jefferson, 1928 | 1928 | 1942 |
| Crow, M. B., R, Hendersonville; Univ. of Arkansas, 1934 | 1946 | 1947 |
| Dixon, Guy E. (Hon.), PN, Hendersonville; St. Louis Coll. of P. & S., 1903 | 1903 | 1903 |
| Fauntleroy, Joseph Whittlesey, Ob, Zirconia; Columbia, 1896 | 1900 | 1929 |
| Fortescue, William Nicholas, GP, Hendersonville; Duke, 1934 | 1934 | 1936 |
| King, Duncan Ingraham Campbell, Pd, Hendersonville; Med. Coll. of S. C., 1935 | 1936 | 1937 |
| Kirk, William Redin (Hon.), I, Hendersonville; Central Univ. of Ky., 1891 | 1901 | 1903 |
| Major, R. T., ALR, Hendersonville; Johns Hopkins, 1916 | 1944 | 1944 |
| Pay, Wilson Cyrus, GP&S, Hendersonville; Univ. of Louisville, 1894 | 1938 | 1940 |
| Russell, Lloyd Pacemas, GP, Fletcher; Univ. of Nashville, 1901 | 1902 | 1903 |
| Salley, Edward McQueen (Hon.), ObG, Hendersonville; Univ. of Md., 1905 | 1905 | 1908 |
| Sample, Robert Cannon, GP, Hendersonville; Univ. of Pa., 1915 | 1915 | 1920 |
| Souther, W. E., GP, Hendersonville; Univ. of Tenn., 1943 | 1946 | 1947 |
| Sumner, Thomas W., GP, Hendersonville; Jefferson, 1910 | 1910 | 1911 |
| Trotter, Fred Oscar, S, Hendersonville; Univ. of Minnesota, 1933 | 1934 | 1934 |
| Ulloth, Gustave, GP, Hendersonville; Coll. of Med. Evangelists, 1932 | 1939 | 1941 |
| Wallace, Lew Ernest, S, Hendersonville; Coll. of Med. Evangelists, 1925 | 1943 | 1944 |

## HERTFORD COUNTY SOCIETY[36]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** | | |
| **Secretary:** Matheson, Joseph Gaddy, OALR, Ahoskie; Jefferson, 1929 | 1929 | 1931 |
| Cooke, Quinton Edwin, GP, Murfreesboro; Med. Coll. of Va., 1937 | 1937 | 1939 |
| Futrell, Lokie Melton, GP, Murfreesboro; Med. Coll. of Va., 1914 | 1914 | 1918 |
| Mitchell, Paul Hayne (Hon.), Ahoskie; Univ. Coll. of Med., Richmond, 1907 | 1907 | 1908 |
| Ruffin, Jennings Bryan, Ahoskie; Med. Coll. of Va., 1937 | 1937 | 1942 |
| Walker, Louis Kyle, GP, Ahoskie; Univ. of Md., 1911 | 1911 | 1917 |

## HOKE COUNTY SOCIETY[37]

| | | |
|---|---|---|
| **President:** Hiatt, Joseph S., Jr., T, Sanatorium; Duke, 1939 | 1941 | 1945 |
| **Secretary:** Oliver, R. K., T, Sanatorium; Univ. of Tenn., 1942 | 1946 | 1947 |
| Brown, George W. (Hon.), GP, Raeford; Ky. Sch. of Med., 1898 | 1900 | 1900 |
| Byrd, William Carey, T, Raeford; Jefferson, 1923 | 1925 | 1937 |
| Johnson, L. Meredith, T, Northville, Mich.; Med. Coll. of Va., 1939 | 1939 | 1944 |
| Levy, E. D., T, Raeford; Duke, 1942 | 1944 | 1947 |
| Matheson, Robert Arthur, GP, Raeford; Jefferson, 1926 | 1926 | 1928 |
| Murray, Robert Lebby, GP, Raeford; Univ. of Md., 1923 | 1923 | 1925 |
| O'Briant, Albert Lee, GP, Raeford; Jefferson, 1920 | 1920 | 1922 |
| Willis, Henry Stuart, T, Sanatorium; Johns Hopkins, 1919 | 1947 | 1947 |

## HYDE COUNTY SOCIETY

## IREDELL-ALEXANDER COUNTIES SOCIETY[38]

| | | |
|---|---|---|
| **President:** Bittinger, Charles Lewis, Mooresville; Univ. of Va., 1935 | 1936 | 1937 |
| **Secretary:** Skeen, Leo Brown, GP, Mooresville; Univ. of Md., 1935 | 1935 | 1936 |
| Bell, Andrew E. (Hon.), GP, Mooresville; Univ. of Md., 1897 | 1897 | 1904 |
| Branca, H. E., OALR, Statesville; N. Y. Med. Coll., 1941 | 1946 | 1946 |
| Clayton, Milton Burns, OALR, Washington, D. C.; Univ. of Louisville, 1917 | 1933 | 1935 |
| Crouch, Thomas Dalton (Hon.), GP, Stony Point; N. C. Med. Coll., 1909 | 1909 | 1915 |
| Davis, James Wagner (Hon.), S, Statesville; Univ. of Pa., 1913 | 1913 | 1915 |
| Gibson, Lauren Osborne (Hon.), ObG, Statesville; N. C. Med. Coll., 1913 | 1913 | 1915 |
| Goode, Thomas Vance (Hon.), S, Statesville; Univ. Coll. of Med., Richmond, 1912 | 1912 | 1916 |
| Holbrook, Joseph Samuel, GP, Statesville; Univ. of Pa., 1932 | 1932 | 1934 |
| Little, Lonnie Marcus, GP, Statesville; Jefferson, 1925 | 1925 | 1927 |
| McElwee, Ross Simonton (Hon.), R, Statesville; Univ. of Md., 1909 | 1909 | 1910 |
| McLelland, William Davies, GP, Mooresville; Jefferson, 1913 | 1913 | 1917 |
| Morrison, James Rudy, GP, Statesville; Georgetown, 1934 | 1935 | 1936 |
| Myers, Dwight Loftin, GP, Harmony; Tulane, 1925 | 1928 | 1929 |
| Painter, William Watson, S, Mooresville; Med. Coll. of S. C., 1937 | 1943 | 1945 |
| Pressly, David, I&Pd, Statesville; Jefferson, 1942 | 1942 | 1946 |
| Pressly, James Lowry, GP, Statesville; Jefferson, 1925 | 1925 | 1928 |
| Rhyne, Sam Albertus, GP, Statesville; N. C. Med. Coll., 1915 | 1915 | 1920 |
| Shaw, Lloyd Roosevelt, GP, Statesville; Med. Coll. of Va., 1930 | 1930 | 1931 |
| Sloan, Allen Barry, GP, Mooresville; Med. Coll. of Va., 1924 | 1924 | 1926 |
| Tatum, Roy Carroll, Taylorsville; Jefferson, 1919 | 1919 | 1920 |
| Taylor, George Winston (Hon.), S, Mooresville; N. C. Med. Coll., 1906 | 1906 | 1907 |
| †Templeton, John Young, GP, Mooresville; Jefferson, 1912 | 1913 | 1927 |
| Thurston, Asa (Hon.), GP, Taylorsville; Univ. of Md., 1909 | 1909 | 1914 |
| Ward, Ernest, PH, Statesville; Baylor Univ., 1918 | 1947 | 1947 |
| Wellborn, William R., GP, Elkin; Tulane, 1942 | 1946 | 1946 |
| Wrenn, Creighton, GP, Mooresville; Tulane, 1935 | 1936 | 1938 |

## JACKSON-SWAIN COUNTIES SOCIETY[39]

| | | |
|---|---|---|
| **President:** Kirchberg, Roy William, Sylva; N. C. Med. Coll., 1916 | 1916 | 1936 |
| **Secretary:** Bacon, Harold Lyle, Bryson City; Northwestern Univ., 1934 | 1935 | 1936 |
| Hooper, Delos D., Sylva; Med. Coll. of Va., 1905 | 1905 | 1905 |
| Nichols, Alvan Alexander (Hon.), GP, Sylva; Univ. of Nashville, 1898 | 1904 | 1904 |
| Nichols, Asbury S. (Hon.), GP, Sylva; Tenn. Med. Coll., 1906 | 1907 | 1913 |
| Slagle, T. D., GP&S, Sylva; Cornell, 1932 | 1945 | 1946 |
| Weiters, John Christopher, Bryson City; Med. Coll. of S. C., 1912 | 1933 | 1934 |
| Wilkes, Grover W., Sylva; N. C. Med. Coll., 1916 | 1916 | 1920 |

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† Deceased.

## JOHNSTON COUNTY SOCIETY[40]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Sox, Carl Caughman, GP, Kenly; George Washington Univ., 1932 | 1936 | 1936 |
| **Secretary:** Jones, Donnie H., Jr., GP, Princeton; Univ. of Va., 1942 | 1942 | 1947 |
| Aycock, Francis Marion, GP, Princeton; Med. Coll. of Va., 1921 | 1921 | 1926 |
| Booker, Edward Nelson, GP, Selma; Univ. of Va., 1925 | 1925 | 1930 |
| Brooks, Harry Eskridge, GP, Clayton; Med. Coll. of Va., 1917 | 1917 | 1923 |
| Cliff, Benjamin Franklin, GP, Benson; George Washington Univ., 1908 | 1909 | 1915 |
| Creech, Bennett, GP, Selma; Univ. of Va., 1944 | 1946 | 1947 |
| Davidian, Vartan A., S, Smithfield; Univ. of Kiev., Russia, 1919 | 1929 | 1930 |
| Duncan, Stacy Allen, GP, Benson; Tulane, 1924 | 1924 | 1925 |
| Earp, Raymond Elmore, S, Selma; Univ. of Pa., 1928 | 1928 | 1941 |
| Fitzgerald, John Herbert, OALR, Smithfield; Jefferson, 1920 | 1920 | 1922 |
| Grady, Edward Stephen, Ob, Smithfield; Tulane, 1937 | 1937 | 1942 |
| Grady, James C. (Hon.), GP, Kenly; Baltimore Univ. Sch. of Med., 1887 | 1887 | 1890 |
| Hinnant, Milford (Hon.), GP, Micro; Univ. of Md., 1912 | 1912 | 1913 |
| Hunter, Shelton B., Jr., GP, Kenly; Med. Coll. of Va., 1940 | 1941 | 1946 |
| Jackson, Marshall Vaden, GP, Princeton; Univ. of Md., 1930 | 1930 | 1937 |
| Lassiter, Will Hardee, Jr., GP, Selma; Med. Coll. of Va., 1938 | 1938 | 1939 |
| McLemore, George A. (Hon.), GP, Smithfield; Univ. of N. C., 1906 | 1906 | 1906 |
| Rose, Abraham Hewitt (Hon.), GP, Smithfield; Jefferson, 1906 | 1906 | 1906 |
| Royster, J. D., GP, Benson; Univ. of Md., 1936 | 1936 | 1942 |
| Stanley, John Haywood (Hon.), GP, Four Oaks; Univ. of N. C., 1904 | 1904 | 1906 |
| Upchurch, Thaddeus Gilbert, GP, Smithfield; Duke, 1932 | 1932 | 1935 |
| Wharton, Charles Watson, GP, Smithfield; La. State Univ., 1937 | 1937 | 1937 |
| Wilson, William Gilliam, GP, Smithfield; Jefferson, 1921 | 1921 | 1924 |
| Woodard, Barney Lelon, GP, Kenly; Univ. of Md., 1933 | 1933 | 1935 |
| Yates, Percy Fenton, GP, Clayton; Emory, 1935 | 1935 | 1938 |

## JONES COUNTY SOCIETY

## LEE COUNTY SOCIETY[41]

| | | |
|---|---|---|
| **President:** James, Arthur Augustus, Jr., GP, Sanford; Univ. of Pa., 1932 | 1932 | 1936 |
| **Secretary:** Blue, Waylon, GP, Jonesboro; Med. Coll. of Va., 1925 | 1925 | 1926 |
| Byerly, James Hampton, GP, Sanford; Northwestern Univ., 1935 | 1936 | 1938 |
| Dotterer, Elizabeth James, GP, Sanford; Univ. of Pa., 1939 | 1939 | 1944 |
| Dotterer, John E., GP, Sanford; Univ. of Va., 1938 | 1946 | 1946 |
| Foster, John Franklin, Pd, Sanford; N. C. Med. Coll., 1916 | 1916 | 1919 |
| Hartness, William Rufus, GP, Jonesboro; Univ. of Louisville, 1938 | 1938 | 1939 |
| Knight, Floyd LaFayette, S, Sanford; Univ. of Va., 1924 | 1925 | 1926 |
| Lutterloh, Isaac Hayden, Jr., GP&S, Sanford; Jefferson, 1921 | 1921 | 1924 |
| McIver, Lynn (Hon.), GP, Sanford; Ky. Univ., 1901 | 1902 | 1902 |
| McLeod, Mary Margaret, Pd, Sanford; Vanderbilt, 1935 | 1935 | 1946 |
| Patterson, Joseph Halford, GP, Broadway; Med. Coll. of Va., 1932 | 1932 | 1934 |
| Sowers, Roy Gerodd, OALR, Sanford; Univ. of Md., 1923 | 1923 | 1924 |

## LENOIR COUNTY SOCIETY[42]

| | | |
|---|---|---|
| **President:** Cranz, Oscar William, S, Kinston; Med. Coll. of Va., 1931 | 1934 | 1936 |
| **Secretary:** Ballard, Claude H., GP, Kinston; Temple, 1941 | 1941 | 1946 |
| Boney, Elwood Rantz, I, Kinston; Univ. of Pa., 1926 | 1926 | 1928 |
| Bundy, James B., GP, LaGrange; Northwestern Med. School, 1944 | 1946 | 1946 |
| Davis, Rachel Darden, Ob, Kinston; Woman's Med. Coll. of Pa., 1932 | 1933 | 1934 |
| Fuller, Henry Fleming, ObG, Kinston; Univ. of Pa., 1936 | 1936 | 1939 |
| Hardy, Ira May (Hon.), ALR, Kinston; Med. Coll. of Va., 1901 | 1902 | 1902 |
| Jennings, Edward C., OALR, Kinston; Temple, 1933 | 1934 | 1936 |
| Jones, Ransom, J., PH, Kinston; Emory, 1932 | 1946 | 1947 |
| Keiter, William Eugene, Pd, Kinston; Washington Univ., 1931 | 1935 | 1935 |
| Lee, Mike, U, Kinston; Tulane, 1926 | 1926 | 1927 |
| Lee, Thomas Leslie, ObG, Kinston; Med. Coll. of Va., 1926 | 1926 | 1927 |
| Meyers, Paul T., R, Kinston; Univ. of Iowa, 1930 | 1946 | 1946 |
| Moseley, Zebulon Vance (Hon.), PH, Kinston; Univ. Coll. of Med., Richmond, 1913 | 1913 | 1914 |
| Offutt, Vernon Delmas, I, Kinston; Med. Coll. of Va., 1933 | 1935 | 1940 |
| Parrott, G. Fountain, I, Kinston; Temple, 1943 | 1944 | 1946 |
| Parrott, John Arendall, Ob, Kinston; Temple, 1940 | 1940 | 1942 |
| Parrott, William Thomas (Hon.), GP, Kinston; Tulane, 1899 | 1899 | 1901 |
| Pritchard, George Littleton, GP, Black Mountain; Univ. Coll. of Med., Richmond, 1913 | 1913 | 1926 |
| Ruffin, David Winston, GP, Pink Hill; Med. Coll. of Va., 1932 | 1932 | 1932 |
| Sabiston, Frank, OALR, Kinston; Univ. of Md., 1918 | 1919 | 1926 |
| Temple, Rufus Henry, I, Kinston; Univ. of Pa., 1936 | 1936 | 1938 |
| Turrentine, Kilby Pairo, I, Kinston; Rush Med. Coll., 1931 | 1932 | 1933 |
| Tyndall, Robert Glenn, S, Kinston; Univ. of Pa., 1928 | 1928 | 1931 |
| West, Bryan Clinton, Pd, Kinston; Univ. of Pa., 1924 | 1924 | 1926 |
| West, Clifton Forrest, GP, Kinston; Univ. of Pa., 1917 | 1917 | 1920 |

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|---|---|---|
| Whitaker, Paul Frederick, I, Kinston; Med. Coll. of Va., 1922 | 1922 | 1924 |
| Williams, Lynwood Earl, I, Kinston; Univ. of Pa., 1940 | 1940 | 1943 |
| Wooten, Floyd Pugh, S, Kinston; Jefferson, 1920 | 1920 | 1923 |

## LINCOLN COUNTY SOCIETY[43]

| | | |
|---|---|---|
| **President:** Page, William Gordon, S&GP, Lincolnton; Jefferson, 1939 | 1946 | 1946 |
| **Secretary:** Wilson, Samuel Allen, Lincolnton; Emory, 1937 | 1937 | 1940 |
| Bandy, William Gaither (Hon.), GP, Lincolnton; Vanderbilt, 1908 | 1912 | 1914 |
| Cornwell, Abner Milton, S, Lincolnton; George Washington Univ., 1927 | 1927 | 1928 |
| Costner, Walter Vance, Pd, Lincolnton; Jefferson, 1924 | 1925 | 1927 |
| Crowell, Lester Avant, Sr. (Hon.), S, Lincolnton; Baltimore Med. Coll., 1892 | 1892 | 1898 |
| Crowell, Lester Avant, Jr., I, Lincolnton; Tulane, 1930 | 1930 | 1930 |
| Edwards, Forest D., Ob, Lawndale; Atlanta Med. Coll., 1914 | 1916 | 1919 |
| Fitzgerald, John Hill, Jr., GP, Lincolnton; Univ. of Va., 1938 | 1940 | 1941 |
| Gamble, John R., Jr., GP, Lincolnton; Univ. of Md. | 1946 | 1946 |
| Griggs, Boyce P., GP, Lincolnton; Bowman Gray Sch. of Med., 1943 | 1943 | 1946 |
| Hoover, Charles Henry (Hon.), GP, Crouse; Baltimore Med. Coll., 1903 | 1903 | 1903 |
| Jacocks, W. P. (Hon.), PH, Raleigh; Univ. of Pa., 1911 | 1911 | 1913 |
| Morton, L. Thomas, OALR, Lincolnton; Univ. of Pa., 1927 | 1927 | 1947 |
| Reinhardt, James Franklin, I, Lincolnton; Duke, 1941 | 1946 | 1946 |

## MACON-CLAY COUNTIES SOCIETY[44]

| | | |
|---|---|---|
| Angel, Edgar, S, Franklin; Jefferson, 1928 | 1932 | 1932 |
| Angel, Furman, S, Franklin; Jefferson, 1918 | 1923 | 1924 |
| Arrendale, Joe J., GP, Cornelia, Ga.; Univ. of Ga., 1941 | 1945 | 1946 |
| Fisher, Ernest W., GP, Franklin; Medical Coll. of S. C., 1941 | 1941 | 1947 |
| Justice, Frank, GP, Franklin; Emory, 1934 | 1945 | 1947 |
| Kahn, Joseph W., GP, Franklin; Univ. of Cinn., 1942 | 1942 | 1946 |
| Killian, Frank McClure, OALR, Franklin; Univ. of Louisville, 1929 | 1929 | 1930 |

## MADISON COUNTY SOCIETY[45]

| | | |
|---|---|---|
| **President:** Robinson, W. Locke, GP, Mars Hill; Med. Coll. of Va., 1929 | 1929 | 1945 |
| **Secretary:** Vance, S. W., GP, Mars Hill; Emory, 1934 | 1934 | 1947 |
| Bolstad, Selma C., GP, Hot Springs; School of Med. Western Reserve Univ., 1931 | 1946 | 1947 |
| Ditmore, Harry Boaz, GP, Marshall; Univ. of Va., 1925 | 1925 | 1947 |
| Duck, Walter Otis, GP, Mars Hill; Hahnemann Med. Coll., 1943 | 1946 | 1946 |
| McElroy, James Lawrence, GP, Marshall; George Washington Univ., 1930 | 1930 | 1932 |
| Ross, George Floyd, GP, Hot Springs; Univ. of Pa., 1907 | 1908 | 1910 |
| Sams, William Albert, GP, Marshall; Lincoln Memorial Univ., 1911 | 1919 | 1920 |

## MARTIN-WASHINGTON-TYRRELL COUNTIES SOCIETY[46]

| | | |
|---|---|---|
| **President:** Rhodes, James Slade, Jr., I, Williamston; Med. Coll. of Va., 1941 | 1941 | 1946 |
| **Secretary:** Harris, Charles I., Jr., GP&S, Williamston; Univ. of Md., 1939 | 1939 | 1946 |
| Bray, Thomas Latham, I, Plymouth; Univ. of Md., 1916 | 1916 | 1919 |
| Brown, Victor Emanuel, I&S, Williamston; Syracuse Univ., 1935 | 1936 | 1937 |
| Chaplin, Steenie Charles, GP, Columbia; Jefferson, 1922 | 1931 | 1933 |
| Furgurson, Ernest Whitmal, GP, Plymouth; Syracuse Univ., 1936 | 1937 | 1938 |
| Harrell, William Horace, GP, Creswell; Jefferson, 1925 | 1925 | 1926 |
| Llewellyn, John Thomas, I, Williamston; Med. Coll. of Va., 1937 | 1939 | 1941 |
| McGowan, Claudius, I, Plymouth; Med. Coll. of Va., 1917 | 1917 | 1922 |
| Nelson, Robert J. (Hon.), PH, Robersonville; Louisville Med. Coll., 1890 | 1890 | 1893 |
| Papineau, Alban, T&GP, Plymouth; Univ. of Pa., 1931 | 1933 | 1934 |
| Phelps, John Mahlon, I, Creswell; Jefferson, 1932 | 1932 | 1935 |
| Pittman, Earl Eugene, I, Oak City; Med. Coll. of Va., 1919 | 1919 | 1920 |
| Rhodes, James Slade (Hon.), I, Williamston; Med. Coll. of Va., 1906 | 1906 | 1907 |
| Ward, Jesse Elliott (Hon.), GP, Robersonville; Univ. of Md., 1904 | 1904 | 1905 |
| Ward, Vernon Albert (Hon.), I, Robersonville; Jefferson, 1908 | 1908 | 1914 |
| Ward, Walter Elliott, I, Robersonville; Med. Coll. of Va., 1940 | 1940 | 1942 |
| Williams, John W., PH, Williamston; Univ. of Md., 1906 | 1906 | 1906 |

## McDOWELL COUNTY SOCIETY[47]

| | | |
|---|---|---|
| **President:** Jonas, John Frank (Hon.), GP, Marion; Baltimore Med. Coll., 1903 | 1903 | 1903 |
| **Secretary:** Rowe, George C., GP, Marion; Univ. of Pa., 1939 | 1939 | 1944 |
| Hagna, Lewis William, GP, Marion; Univ. of Pa., 1936 | 1938 | 1940 |
| Hemphill, Clyde Hoke, OALR, Highlands; Univ. of Md., 1913 | 1913 | 1916 |
| Johnson, John Brown, S, Old Fort; Univ. of Louisville, 1905 | 1914 | 1914 |
| Justice, Gaston B. (Hon.), GP, Marion; Atlanta Coll. of P. & S., 1907 | 1907 | 1908 |
| Kirby, Guy S. (Hon.), GP, Marion; Univ. Coll. of Med., Richmond, 1897 | 1896 | 1903 |
| McBee, Paul Thomas, S, Marion; Med. Coll. of Va., 1930 | 1930 | 1933 |
| McIntosh, Donald Munro (Hon.), S, Old Fort; Med. Coll. of Va., 1904 | 1907 | 1908 |
| McIntosh, Donald Munro, Jr., GP, Marion; Univ. of Pa., 1933 | 1935 | 1936 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Miller, Lloyd, GP, Marion; Med. Coll. of Va., 1939 | 1947 | 1947 |
| Miller, John Floyd, S, Marion; Medico-Chir. Coll. of Phila., 1906 | 1915 | 1919 |
| Robinson, William Ashby, Old Fort; Med. Coll. of Va., 1900 | 1903 | 1930 |
| Rowe, Virginia Copeland, GP, Marion; Tulane, 1939 | 1939 | 1942 |

## MECKLENBURG COUNTY SOCIETY[48]

| | | |
|---|---|---|
| **President:** Kelly, Luther Wrentmore, I, Charlotte; Univ. of Va., 1924 | 1926 | 1927 |
| **Secretary:** Johnston, William Oliver, I, Charlotte; Vanderbilt, 1936 | 1936 | 1940 |
| Adams, James Robert, Pd, Charlotte; Univ. of Va., 1928 | 1932 | 1933 |
| Alexander, James Moses, I, Charlotte; McGill Univ., 1934 | 1934 | 1937 |
| Alexander, James Ramsey (Hon.), Charlotte; Univ. of Md., 1894 | 1894 | 1899 |
| Andrews, Edward David, Charlotte; Med. Coll. of S. C., 1917 | 1924 | 1930 |
| Ashe, John Rainey (Hon.), Pd, Charlotte; Columbia, 1911 | 1915 | 1915 |
| Austin, DeWitt Ray, P&U, Charlotte; Jefferson, 1917 | 1917 | 1919 |
| Austin, Frederick Da Costa, Jr., S&U, Charlotte; Vanderbilt, 1937 | 1937 | 1939 |
| Baird, Harry Haynes, U, Charlotte; Washington Univ., 1942 | 1942 | 1944 |
| Baker, Thomas Williams, I, Charlotte; Univ. of Pa., 1931 | 1931 | 1938 |
| Barnes, Margaret A., P, Charlotte; Univ. of Va., 1943 | 1943 | 1945 |
| Barron, Archibald Alexander (Hon.), PN, Charlotte; Vanderbilt, 1909 | 1910 | 1911 |
| Baxter, Oscar Dixon, R, Charlotte; Jefferson, 1924 | 1924 | 1929 |
| Bellows, Rowland Thompson, NS, Charlotte; Cornell, 1930 | 1940 | 1941 |
| Bethel, Millard Baimbridge, PH, Charlotte; Univ. of Tenn., 1936 | 1938 | 1939 |
| Bigham, Roy Stinson, Jr., I, Charlotte; Univ. of Va., 1941 | 1941 | 1946 |
| Black, George William, N, Charlotte; Med. Coll. of Va., 1924 | 1924 | 1925 |
| Bost, Thomas Creasy, S, Charlotte; George Washington Univ., 1915 | 1920 | 1921 |
| Boyles, Memory Ford, OALR, Charlotte; N. C. Med. Coll., 1917 | 1917 | 1920 |
| Brabson, John Anderson, S, Charlotte; Harvard, 1939 | 1943 | 1944 |
| Bradford, Wallace Brown, ObG, Charlotte; Univ. of Pa., 1932 | 1932 | 1937 |
| Bradford, Williamson Ziegler, ObG, Charlotte; Univ. of Pa., 1928 | 1928 | 1930 |
| Brenizer, Addison Gorgas (Hon.), S, Charlotte; Johns Hopkins, 1908 | 1911 | 1911 |
| Bunch, Charles, S, Charlotte; Univ. of S. C., 1931 | 1931 | 1935 |
| Byrnes, Thomas Henderson, Path, Charlotte; Med. Coll. of S. C., 1926 | 1932 | 1932 |
| Choate, Allyn Blythe, I, Charlotte; Med. Coll. of Va., 1929 | 1929 | 1933 |
| Cochrane, Fred Richard, Charlotte; Jefferson, 1942 | 1942 | 1946 |
| Cooke, H. M., GP, Charlotte; Med. Coll. of Va., 1941 | 1943 | 1943 |
| Cornell, William Sessions, S, Charlotte; Emory, 1931 | 1938 | 1938 |
| Craven, Thomas, GP, Huntersville; Jefferson, 1917 | 1917 | 1919 |
| †Craven, William Wilhelm (Hon.), GP, Charlotte; Univ. of Md., 1903 | 1904 | 1911 |
| Crowell, James Allen, ObG, Charlotte; La. State Univ., 1939 | 1946 | 1946 |
| Daniel, Walter Eugene, U, Charlotte; Med. Coll. of Va., 1931 | 1938 | 1938 |
| Davidson, John E. S. (Hon.), Oph, Charlotte; Univ. of Md., 1894 | 1894 | 1898 |
| DeCamp, Allen Ledyard, ObG, Charlotte; Univ. of Pa., 1934 | 1937 | 1938 |
| †Donnelly, John (Hon.), T, Charlotte; Univ. of N. C., 1905 | 1905 | 1908 |
| Dorenbusch, Alfred A., Otol., Charlotte; Univ. of Louisville, 1940 | 1946 | 1946 |
| Draper, Arthur J., I, Charlotte; Harvard, 1942 | 1945 | 1945 |
| Edgerton, Glenn Souders, ObG, Charlotte; Temple, 1932 | 1932 | 1934 |
| Elliott, Joseph Alexander, D, Charlotte; Univ. of Mich., 1914 | 1919 | 1920 |
| Faison, Elias Sampson, I, Charlotte; Emory, 1929 | 1929 | 1933 |
| Faison, Yates Wellington (Hon.), Pd. Charlotte; Harvard, 1910 | 1910 | 1911 |
| Ferguson, Robert Thrift, G, Charlotte; Univ. Coll. of Med., Richmond, 1906 | 1909 | 1922 |
| Fleming, Lawrence Edwin, S, Charlotte; Univ. of Pa., 1931 | 1931 | 1934 |
| Foster, Clarence B., Oph, Charlotte; Univ. of Vermont, 1932 | 1945 | 1946 |
| Franklin, Ernest Washington, ObG, Charlotte; Univ. of Pa., 1930 | 1930 | 1932 |
| Gage, Lucius Gaston, I, Charlotte; Univ. of Va., 1915 | 1921 | 1922 |
| Gallant, Robert Miller (Hon.), GP, Charlotte; N. C. Med. Coll., 1915 | 1915 | 1916 |
| Gaul, John Stuart, Or, Charlotte; Medico-Chir. Coll. of Phila., 1913 | 1922 | 1923 |
| Gay, Charles Houston, P, Charlotte; Duke, 1933 | 1936 | 1938 |
| Gibbon, James Wilson, S, Charlotte; Jefferson, 1918 | 1920 | 1921 |
| Gibbon, Robert Lardner (Hon.), S, Charlotte; Jefferson, 1887 | 1887 | 1888 |
| Gilland, John deSaussure, S, Charlotte; Med. Coll. of S. C., 1938 | 1943 | 1944 |
| Gilmour, Monroe Taylor, I, Charlotte; Harvard, 1936 | 1940 | 1941 |
| Gordon, John Simpson, ALR, Charlotte; Univ. of Pa., 1931 | 1947 | 1947 |
| Greenwood, James G., Hosp Res., Charlotte; Univ. of Pa., 1944 | 1944 | 1947 |
| Hamer, William Alexander, Anes, Charlotte; Univ. of Md., 1930 | 1930 | 1932 |
| Hand, Edgar Hall (Hon.), PH, Charlotte; N. C. Med. Coll., 1907 | 1907 | 1913 |
| Harrell, W. Fletcher, P, Charlotte; Univ. of Va., 1943 | 1947 | 1947 |
| Hart, Verling Kersey, ALR, Charlotte; Univ. of Pa., 1921 | 1924 | 1925 |
| Hawes, George Aubrey, U, Charlotte; Vanderbilt, 1933 | 1939 | 1939 |
| Hemphill, James Eugene, R, Charlotte; Univ. of Va., 1937 | 1942 | 1942 |
| Hendrickson, Glenn G., S, Charlotte; Vanderbilt, 1940 | 1946 | 1946 |
| Henry, Hector Himel, PH, Charlotte; Tulane, 1936 | 1939 | 1940 |
| Hipp, Edward Reginald, S, Charlotte; Univ. of Va., 1918 | 1920 | 1921 |

† Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Hodges, Horace Hayden, I, Charlotte; Univ. of Pa., 1940 | 1940 | 1947 |
| Holden, Howard Thompson, OALR, Charlotte; Univ. of Va., 1934 | 1945 | 1946 |
| Holton, Thomas Jefferson, OALR, Charlotte; Emory, 1909 | 1925 | 1926 |
| Hope, Alex Chalmers, S&G, Charlotte; Med. Coll. of S. C., 1937 | 1945 | 1945 |
| Houser, Oscar Julian (Hon.), OALR, Charlotte; N. C. Med. Coll., 1914 | 1914 | 1916 |
| Hovis, Leighton Watson (Hon.), OALR, Charlotte; N. C. Med. Coll., 1904 | 1904 | 1906 |
| Hunt, Jasper Stewart, Pd, Charlotte; Vanderbilt, 1929 | 1932 | 1933 |
| Jacobs, Julian Erich John, Or, Charlotte; Univ. of Neb., 1935 | 1939 | 1940 |
| Johnston, James Gilliam (Hon.), OALR, Charlotte; Vanderbilt, 1899 | 1913 | 1916 |
| Jones, Grace Germania, S, Charlotte; Woman's Med. Coll. of Pa., 1934 | 1942 | 1943 |
| Jones, Otis Hunter, Ob, Charlotte; Columbia, 1933 | 1933 | 1937 |
| Kennedy, John Pressly, S, Charlotte; Jefferson, 1915 | 1915 | 1920 |
| Kennedy, Leon Toland, PH, Charlotte; Jefferson, 1935 | 1937 | 1939 |
| Kimmelstiel, Paul, Path, Charlotte; Tuebingen, Germany, 1926 | 1940 | 1941 |
| King, Parks McCombs (Hon.), GP, Charlotte; N. Y. Univ., 1902 | 1902 | 1904 |
| Kneedler, William Harding, I, Charlotte; Univ. of Pa., 1926 | 1946 | 1947 |
| Kossove, Albert Anthony, PN, Charlotte; Med. Coll. of Va., 1938 | 1940 | 1941 |
| Kossove, Irene Levy, ObG, Charlotte; Med. Coll. of Va., 1939 | 1940 | 1941 |
| Lafferty, Robert Hervey (Hon.), R, Charlotte; N. C. Med. Coll., 1906 | 1906 | 1906 |
| Leinbach, Robert Frederic (Hon.), I, Charlotte; Univ. of Pa., 1907 | 1907 | 1910 |
| Leonard, Ruth, Oph, Charlotte; Temple, 1942 | 1942 | 1945 |
| MacConnell, John Wilson (Hon.), OALR, Davidson; Univ. of Md., 1907 | 1908 | 1909 |
| MacDonald, J. Kingsley, ObG, Charlotte; McGill Univ., Canada, 1926 | 1946 | 1946 |
| Martin, William Francis, S, Charlotte; Univ. of Md., 1920 | 1920 | 1923 |
| Massey, Charles Caswell, Pr, Charlotte; Jefferson, 1923 | 1923 | 1925 |
| Matthews, Vann Marshall, Ob, Charlotte; Univ. of Pa., 1918 | 1918 | 1921 |
| Matthews, William Camp, I, Charlotte; Univ of Va., 1937 | 1939 | 1939 |
| Mayer, Walter Brem, D, Charlotte; Univ. of Pa., 1930 | 1932 | 1933 |
| McCall, R. E., Jr., ALR, Charlotte; Jefferson, 1936 | 1936 | 1943 |
| McCarty, Ralph L., S, Charlotte; Tulane, 1942 | 1946 | 1947 |
| McCoy, Thomas Marshal (Hon.), GP, Charlotte; N. C. Med. Coll., 1905 | 1906 | 1906 |
| McDonald, Angus Morris, U, Charlotte; Univ. of Pa., 1928 | 1935 | 1937 |
| McKay, Hamilton Witherspoon (Hon.), U, Charlotte; Jefferson, 1910 | 1911 | 1913 |
| McKay, Robert Witherspoon, U, Charlotte; Johns Hopkins, 1923 | 1928 | 1928 |
| McKnight, Roy Bowman, S, Charlotte; Univ. of Pa., 1920 | 1920 | 1928 |
| McLaughlin, Calvin Sturgis, Sr. (Hon.), GP, Charlotte; Univ. of Md., 1896 | 1896 | 1903 |
| McLaughlin, Calvin Sturgis, Jr., GP, Charlotte; Univ. of Tenn., 1935 | 1937 | 1937 |
| McLean, Ewen Kenneth, Pd, Charlotte; Univ. of Texas, 1919 | 1927 | 1928 |
| †McPhail, Lorenzo Dow (Hon.), Pr, Charlotte; Univ. of Md., 1900 | 1900 | 1902 |
| Miller, Oscar Lee, Or, Charlotte; Atlanta Coll. of P. & S., 1912 | 1921 | 1922 |
| Miller, Robert P., S, Charlotte; Duke, 1940 | 1942 | 1946 |
| Montgomery, John Christian, Anes, Charlotte; Univ. of Pa., 1932 | 1935 | 1936 |
| Moore, Alexander Wylie (Hon.), S&G, Charlotte; Univ. of Va., 1901 | 1912 | 1913 |
| Moore, Oren (Hon.), G, Charlotte; N. C. Med. Coll., 1911 | 1911 | 1912 |
| Moore, Robert Ashe, Pd, Charlotte; Univ. of Pa., 1923 | 1924 | 1925 |
| Motley, Fred Elliott, ALR, Charlotte; Univ. of Mich., 1922 | 1926 | 1927 |
| Munroe, Colin A., S, Boston, Mass.; Duke, 1939 | 1941 | 1946 |
| Munroe, Henry Stokes, Sr. (Hon.), S, Charlotte; Jefferson, 1903 | 1902 | 1904 |
| Munroe, Henry Stokes, Jr., S, Charlotte; Duke, 1935 | 1937 | 1940 |
| Murrah, Thomas A., III, Hosp Res., Charlotte; Med. Coll. of S. C., 1943 | 1947 | 1947 |
| Nalle, Brodie Crump (Hon.), ObG, Charlotte; Univ. of Va., 1903 | 1905 | 1905 |
| Nalle, Brodie Crump, Jr., U, Charlotte; Duke, 1939 | 1947 | 1947 |
| Nance, Charles Lee, GP, Charlotte; N. C. Med. Coll., 1919 | 1921 | 1922 |
| Naumoff, Philip, GP, Charlotte; Duke, 1937 | 1939 | 1939 |
| Neblett, Herbert Clarence, Oph, Charlotte; Med. Coll. of Va., 1914 | 1921 | 1929 |
| Newell, Leon Burns (Hon.), GP, Charlotte; Univ. of N. C., 1905 | 1905 | 1906 |
| Newton, Howard Lowell, GP, Charlotte; Northwestern, 1921 | 1923 | 1925 |
| Nisbet, Douglas Heath, I, Charlotte; Harvard, 1917 | 1917 | 1920 |
| Norris, Charles Bradley, I, Charlotte; Georgetown, 1941 | 1941 | 1947 |
| Northington, James Montgomery (Hon.), I, Charlotte; Med. Coll. of Va., 1905 | 1909 | 1909 |
| Nowlin, George Preston, S, Charlotte; Univ. of Va., 1924 | 1929 | 1930 |
| Peeler, Clarence N. (Hon.), ALR, Charlotte; N. C. Med. Coll., 1906 | 1906 | 1908 |
| Pennington, Glenn Walton, ALR, Charlotte; Univ. of Ga., 1937 | 1946 | 1946 |
| Petteway, George Henry (Hon.), GP, Charlotte; N. C. Med. Coll., 1913 | 1913 | 1914 |
| Pettus, William Henry, Jr., S, Charlotte; Cornell, 1937 | 1941 | 1942 |
| Pitts, William Reid, S, Charlotte; Harvard, 1933 | 1939 | 1940 |
| Potter, E. Lindsay, Jr., GP, Charlotte; Temple, 1939 | 1939 | 1946 |
| Query, Richard Zimri, Jr., I, Charlotte; Duke, 1934 | 1937 | 1938 |
| Rankin, Watson Smith (Hon.), PH, Charlotte; Univ. of Md., 1901 | 1901 | 1901 |
| Ranson, John Lester, Sr. (Hon.), Anes, Charlotte; N. C. Med. Coll., 1911 | 1911 | 1912 |
| Ray, Frank Leonard, U, Charlotte; Med. Coll. of Va., 1919 | 1919 | 1922 |
| Reid, Calvin Graham, I, Charlotte; Univ. of Pa., 1935 | 1938 | 1939 |
| Reid, Ralph Connor, S, Charlotte; Columbia, 1940 | 1942 | 1943 |
| Robinson, Charles Wilson, GP, Charlotte; Univ. of Pa., 1930 | 1930 | 1932 |

† Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Ross, Otho Bescent (Hon.), R, Charlotte; Univ. of Pa., 1909 | 1909 | 1912 |
| Ross, Thomas Wallace, GP, Charlotte; Jefferson, 1927 | 1927 | 1930 |
| Sanger, W. Paul, S, Charlotte; Vanderbilt, 1931 | 1937 | 1938 |
| Scruggs, William Marvin, S, Charlotte; Univ. of Pa., 1914 | 1914 | 1920 |
| Seay, Hillis Ledbetter, T, Huntersville; Vanderbilt, 1930 | 1933 | 1934 |
| Selby, William Elledge, NP, Charlotte; Temple, 1934 | 1934 | 1936 |
| Shull, Joseph Rush (Hon.), R, Charlotte; Univ. of Pa., 1910 | 1910 | 1913 |
| Sloan, Henry Lee, Oph, Charlotte; Univ. of Pa., 1911 | 1913 | 1920 |
| Smith, Franklin Calton, Oph, Charlotte; Jefferson, 1921 | 1921 | 1925 |
| Southerland, Robert William, PN, Charlotte; Med. Coll. of Va., 1928 | 1939 | 1945 |
| Sparrow, Thomas DeLamar, S, Charlotte; Univ. of Pa., 1920 | 1920 | 1923 |
| Squires, Claude Babbington, U, Charlotte; Jefferson, 1919 | 1919 | 1921 |
| Steiger, Howard P., D, Charlotte; Duke, 1939 | 1947 | 1947 |
| Stuckey, Charles L., I, Charlotte; Univ. of Va., 1940 | 1946 | 1947 |
| Summerville, Walter Monroe, CP, Charlotte; Emory, 1936 | 1936 | 1937 |
| Taylor, Andrew DuVal, A, Charlotte; Univ. of Md., 1934 | 1934 | 1937 |
| Teasdale, Laurie Redmond, Or, Charlotte; Dalhousie Univ. Faculty of Med., 1936 | 1936 | 1940 |
| Thompson, Silas Raymond (Hon.), U, Charlotte; N. C. Med. Coll., 1914 | 1914 | 1915 |
| Todd, Lester Claire, CP, Charlotte; Univ. of Mich., 1918 | 1920 | 1920 |
| Townsend, Maurice Lyndon (Hon.), Society Hill, S. C.; Indiana Med. Coll., 1906 | 1912 | 1913 |
| Tuggle, Allan Davis, R, Charlotte; Univ. of Louisville, 1936 | 1940 | 1941 |
| Tydeman, Frederick William Louis, CP, San Francisco; N. C. Med. Coll., 1912 | 1912 | 1918 |
| Venning, William L., Pd, Charlotte; Duke, 1939 | 1943 | 1944 |
| Walker, Landon D., GP, Charlotte; Med. Coll. of Va., 1908 | 1917 | 1919 |
| Wannamaker, Edward Jones, Jr., I, Charlotte; Univ. of Pa., 1921 | 1924 | 1925 |
| Watkins, Carlton Gunter, Pd, Charlotte; Washington Univ. Sch. of Med., St. Louis, 1943 | 1943 | 1946 |
| Welton, David Goe, D, Charlotte; Univ. of Wis., 1935 | 1939 | 1939 |
| Whisnant, Albert Miller (Hon.), OALR, Charlotte; Coll. of P. & S., Baltimore, 1893 | 1893 | 1899 |
| White, Thomas Preston, I, Charlotte; Univ. of Pa., 1922 | 1924 | 1925 |
| Whitley, Ayer, GP, Matthews; Baltimore Med. Coll., 1908 | 1908 | 1919 |
| Williams, McChord, S, Charlotte; Harvard, 1937 | 1937 | 1942 |
| Winkler, Harry, Or, Charlotte; Rush Med. Coll., 1929 | 1931 | 1931 |
| Woltz, John Henry Early, ObG, Charlotte; Univ. of Pa., 1942 | 1942 | 1946 |
| Woods, James Baker, Jr., GP, Davidson; Med. Coll. of Va., 1922 | 1942 | 1943 |
| Wright, Thomas Hasel, Jr., P, Charlotte; Univ. of Pa., 1936 | 1945 | 1946 |

## MITCHELL-YANCEY COUNTIES SOCIETY[49]

| | | |
|---|---|---|
| **President:** | | |
| **Secretary:** Berry, James W., GP, Bakersville; Bowman Gray Sch. of Med., 1944 | 1944 | 1946 |
| Bennett, William Lewis, GP, Burnsville; Lincoln Memorial Univ., 1911 | 1932 | 1933 |
| Gouge, Arthur Edward, GP, Bakersville; Med. Coll. of Va., 1917 | 1917 | 1920 |
| Ohle, E. R., GP, Celo; Harvard, 1941 | 1946 | 1947 |
| Peterson, Charles A. (Hon.), GP, Spruce Pine; N. C. Med. Coll., 1907 | 1907 | 1908 |
| Quincy, Fred Ben, Ob&Pd, Williamson, W. Va.; Med. Coll. of Va., 1900 | 1945 | 1945 |
| Williams, Lester L., GP, Spruce Pine; Med. Coll. of S. C., 1880 | 1924 | 1927 |

## MONTGOMERY COUNTY SOCIETY[50]

| | | |
|---|---|---|
| Andrews, Vernon L., GP, Mount Gilead; Columbia Univ., 1942 | 1942 | 1947 |
| Eckerson, Charles Neil, GP, Troy; Med. Coll. of Va., 1935 | 1935 | 1942 |
| Koogler, Benjamin Robert, GP, Candor; Ohio State Med. Coll., 1938 | 1939 | 1941 |
| Rankin, Pressly Robinson (Hon.), GP, Mt. Gilead; N. C. Med. Coll., 1910 | 1910 | 1912 |

## MOORE COUNTY SOCIETY[51]

| | | |
|---|---|---|
| **President:** Felton, Robert Lee, Jr., GP, Carthage; Univ. of Pa., 1927 | 1927 | 1930 |
| **Secretary:** Rosser, Robert Guthrie (Hon.), GP, Vass; N. C. Med. Coll., 1909 | 1909 | 1911 |
| Bowen, James Poore, S, Aberdeen; Univ. of Md., 1929 | 1932 | 1934 |
| Bowman, Hugh Edgar (Hon.), GP, Aberdeen; N. C. Med. Coll., 1904 | 1904 | 1905 |
| Chester, Pinkney Jones, OALR, Southern Pines; N. C. Med. Coll., 1913 | 1913 | 1920 |
| Grier, Charles Talmadge (Hon.), Carthage; N. C. Med. Coll., 1910 | 1912 | 1913 |
| Grier, John C., P, West End; Jefferson, 1940 | 1940 | 1947 |
| Heinitsh, George, OALR, Southern Pines; Duke, 1932 | 1932 | 1935 |
| Hilborn, Caroline Lunetta, GP, Robbins; Cleveland Homeopathic Med. Coll., 1913 | 1923 | 1939 |
| Hilborn, Robert Ross, GP, Robbins; American Med. Missionary Coll., 1904 | 1923 | 1939 |
| Marr, Myron Whitmore (Hon.), I, Pinehurst; Tufts Med. Sch., 1907 | 1909 | 1915 |
| McLeod, Alexander H. (Hon.), S, Aberdeen; Baltimore Med. Coll., 1896 | 1896 | 1904 |
| McLeod, Vida Canaday, GP, Southern Pines; Baylor Univ., 1919 | 1931 | 1931 |
| McMillan, Robert M., I, Southern Pines; Johns Hopkins, 1938 | 1938 | 1946 |
| Milliken, James Shepard (Hon.), GP, Southern Pines; Jefferson, 1915 | 1915 | 1916 |
| Monroe, Clement Rosenburg, S, Pinehurst; Univ. of Md., 1924 | 1925 | 1930 |
| Mudgett, William Chase (Hon.), I, Southern Pines; Maryland Med. Coll., 1903 | 1908 | 1908 |
| Owens, Francis Leroy, S, Pinehurst; Duke, 1934 | 1935 | 1938 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Peacock, Thomas Gerald, P, Pinebluff; Harvard, 1921 | 1944 | 1946 |
| Pishkoe, M. T., S, Pinehurst; Duke, 1936 | 1939 | 1945 |
| Street, Murdo Eugene, Jr., Glendon; Duke, 1937 | 1941 | 1942 |
| Symington, John, PH, Carthage; Univ. of Md., 1902 | 1927 | 1928 |
| Willcox, Jesse Womble (Hon.), T, Wilmington; Univ. of N. C., 1906 | 1906 | 1906 |

## NASH—SEE EDGECOMBE-NASH

## NEW HANOVER COUNTY SOCIETY[52]

| | | |
|---|---|---|
| **President:** Fales, Robert Martin, GP, Wilmington; Jefferson, 1932 | 1932 | 1936 |
| **Secretary:** Warshauer, Samuel E., I, Wilmington; Med. Coll. of Va., 1936 | 1936 | 1946 |
| Anderson, Elbert Carl, Oph, Wilmington; Northwestern, 1937 | 1937 | 1939 |
| Anderson, Irene, P, Wrightsville Beach; Univ. of Oklahoma, 1939 | 1947 | 1947 |
| Barefoot, Graham Ballard, Path&R, Wilmington; Jefferson, 1923 | 1923 | 1924 |
| Barefoot, William Frederick, S, Wilmington; Tulane, 1934 | 1934 | 1935 |
| Bellamy, Robert Hartlee (Hon.), GP, Wilmington; Jefferson, 1902 | 1902 | 1902 |
| Black, Paul Adrian Lawrence, Wilmington; Coll. of Med. Evangelists, 1932 | 1935 | 1938 |
| Brouse, I. E., R, Wilmington; McGill Univ., 1922 | 1946 | 1947 |
| Brown, Landis Gold, S, Southport; Northwestern, 1934 | 1935 | 1938 |
| Codington, Herbert Augustus (Hon.), S, Wilmington; Univ. of Md., 1911 | 1915 | 1917 |
| Coleman, Howe Reese, Jr., OALR, Wilmington; Univ. of Va., 1929 | 1941 | 1942 |
| Cranmer, John B. (Hon.), S, Wilmington; Univ. of N. C., 1905 | 1905 | 1906 |
| Crouch, Auley McRae, Sr., Pd, Wilmington; Jefferson, 1916 | 1916 | 1918 |
| Crouch, Auley McRae, Jr., Pd, Wilmington; Jefferson, 1943 | 1943 | 1946 |
| Davis, Charles Burdis, GP, Wilmington; Univ. of Pa., 1935 | 1935 | 1939 |
| Dickie, J. W., GP, Wilmington; Univ. of Va., 1942 | 1947 | 1947 |
| Dosher, William Sterling, ObG, Wilmington; Med. Coll. of Va., 1930 | 1930 | 1934 |
| Elliot, Avon Hall, PH, Wilmington; Jefferson, 1919 | 1919 | 1921 |
| †Evans, John Ebenezer, S, Wilmington; Univ. of Md., 1916 | 1916 | 1921 |
| Farthing, John Watts, S, Wilmington; Univ. of Pa., 1933 | 1938 | 1939 |
| Fergus, Leroy Clark, S&GP, Southport; Med. Coll. of Va., 1935 | 1937 | 1938 |
| Freeman, Jere David, OALR, Wilmington; Med. Coll. of Va., 1918 | 1921 | 1922 |
| Graham, Charles Pattison, S, Wilmington; Harvard, 1932 | 1932 | 1937 |
| Hare, Ransom Bryant, U, Wilmington; Med. Coll. of S. C., 1930 | 1933 | 1934 |
| Harriss, Andrew Howell (Hon.), GP, Wilmington; Medico-Chir. Coll. of Phila., 1893 | 1892 | 1894 |
| Hoggard, John Thomas, GP, Wilmington; Univ. Coll. of Med., Richmond, 1906 | 1906 | 1922 |
| Hooper, Joseph Ward (Hon.), S, Wilmington; Univ. of Md., 1909 | 1912 | 1917 |
| Johnson, George W., ObG, Wilmington; Univ. of Pa., 1920 | 1920 | 1921 |
| Knox, Joseph Clyde, PH, Wilmington; Univ. of Md., 1924 | 1924 | 1932 |
| Koonce, Donald B., S, Wilmington; Univ. of Pa., 1929 | 1929 | 1934 |
| Koonce, S. Everett (Hon.), OALR, Wilmington; P. & S., Baltimore, 1896 | 1896 | 1900 |
| Koseruba, George M., Pd, Wilmington; Coll. of Med. Evangelists | 1939 | 1944 |
| Lounsbury, James Breckinridge, ObG, Wilmington; Yale, 1935 | 1941 | 1942 |
| McEachern, Duncan Roland, GP, Wilmington; Med. Coll. of Va., 1932 | 1932 | 1935 |
| Mebane, William Carter, Jr., S, Wilmington; Univ. of Md., 1931 | 1932 | 1934 |
| Moore, William Houston (Hon.), Ob, Wilmington; Jefferson, 1910 | 1910 | 1911 |
| Murchison, David Reid, I, Wilmington; Johns Hopkins, 1916 | 1922 | 1923 |
| Pickard, H. M., I, Wilmington; McGill Univ., 1938 | 1946 | 1946 |
| Pigford, R. T., I, Wilmington; Univ. of Md., 1940 | 1940 | 1947 |
| Powell, C. J., GP, Wilmington; Univ. of Tenn., 1943 | 1946 | 1947 |
| Robertson, James Farish (Hon.), S, Wilmington; Univ. of Pa., 1913 | 1913 | 1916 |
| Rodman, Robert Boyd, I, Wilmington; Med. Coll. of S. C., 1928 | 1928 | 1930 |
| Rosenbaum, Maurice Milton, S, Shallotte; Univ. of Buffalo, 1934 | 1936 | 1937 |
| Sidbury, James Buren (Hon.), Pd, Wilmington; Columbia, 1912 | 1915 | 1916 |
| Sinclair, Roby Thomas, Jr., GP, Wilmington; Georgetown Univ., 1938 | 1938 | 1940 |
| Sloan, David Bryan, OALR, Wilmington; Univ. of Pa., 1914 | 1914 | 1920 |
| Smith, J. H., Path, Wilmington; Univ. of Pa., 1918 | 1944 | 1946 |
| Stuck, P. L., GP, Wilmington; Northwestern, 1941 | 1947 | 1947 |
| Taylor, William Ivey (Hon.), GP, Burgaw; N. C. Med. Coll., 1902 | 1904 | 1905 |
| Taylor, William Ivey, Jr., GP, Burgaw; Jefferson, 1941 | 1941 | 1946 |
| Thompson, George Richard Cunliffe, GP, Wilmington; Med. Coll. of S. C., 1939 | 1942 | 1943 |
| Walden, Kennon C., S, Wilmington; Med. Coll. of Va., 1930 | 1943 | 1943 |
| Walker, Elmer Pixley, GP, Wilmington; Emory, 1936 | 1936 | 1941 |
| Wessell, John Charles (Hon.), I, Wilmington; Univ. of Md., 1900 | 1900 | 1900 |

## NORTHAMPTON COUNTY SOCIETY[53]

| | | |
|---|---|---|
| Lister, John L. (Hon.), U, Jackson; Med. Coll. of Va., 1896 | 1896 | 1909 |
| Outland, Robert Boone, GP, Rich Square; Univ. of Pa., 1932 | 1932 | 1936 |
| Stephenson, Bennett Edward, GP, Rich Square; Med. Coll. of Va., 1935 | 1935 | 1937 |

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† Deceased.

## ONSLOW COUNTY SOCIETY[54]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Turlington, William Troy, Jr., GP, Jacksonville; Univ. of N. Y., 1929 | 1929 | 1930 |
| **Secretary:** Henderson, John Percy, GP, Jacksonville; Med. Coll. of Va., 1918 | 1919 | 1921 |
| Bryan, Lorenzo Dow (Hon.), GP, Sneads Ferry; Tulane, 1910 | 1910 | 1911 |
| Chandler, E. T., GP, Richlands; Univ. of Tenn., 1936 | 1946 | 1946 |
| Corbett, James Patrick, GP, Swansboro; Washington Univ., St. Louis, 1928 | 1928 | 1930 |
| Cox, Samuel Clements, GP, Jacksonville; Med. Coll. of Va., 1935 | 1935 | 1937 |
| Dixon, P. L., Jr., GP, Richlands; Univ. of Md., 1942 | 1942 | 1946 |
| Gleitz, Allen A., S, Jacksonville; Jefferson, 1928 | 1944 | 1944 |
| Gurganus, George Elwood, GP, Jacksonville; Temple, 1937 | 1937 | 1939 |
| Martin, John R., GP, Holly Ridge; N. Y. Med. Coll., 1943 | 1947 | 1947 |

## ORANGE—SEE DURHAM-ORANGE

## PAMLICO COUNTY SOCIETY[55]

| | | |
|---|---|---|
| **President:** Dees, Daniel Alfonzo (Hon.), OALR, Bayboro; Baltimore Med. Coll., 1903 | 1903 | 1905 |
| **Secretary:** Purdy, James Jarrett (Hon.), Oriental; Med. Coll. of Va., 1900 | 1914 | 1915 |
| Daniels, Oscar Carroll (Hon.), OALR, Oriental; Med. Coll. of Va., 1903 | 1903 | 1903 |
| McCotter, St. Elmo (Hon.), Ob, Bayboro; Atlanta Coll. of P. & S., 1908 | 1908 | 1909 |

## PASQUOTANK-CAMDEN-CURRITUCK-DARE COUNTIES SOCIETY[56]

| | | |
|---|---|---|
| **President:** Bailey, M. H., Elizabeth City; Northwestern, 1931 | 1933 | 1940 |
| **Secretary:** Weeks, John F., GP, Elizabeth City; Jefferson, 1942 | 1942 | 1946 |
| Barkwell, John H., GP, Weeksville; Atlanta Sch. of Med., 1908 | 1924 | 1925 |
| Blanchard, Irvin T., GP, Elizabeth City; Temple, 1940 | 1940 | 1946 |
| Bonner, John Bryan Havens, T, Elizabeth City; Med. Coll. of Va., 1932 | 1932 | 1941 |
| Fearing, Isaiah (Hon.), GP, Elizabeth City; Coll. of P. & S., Baltimore, 1896 | 1896 | 1904 |
| Gill, Joseph Armstrong, GP, Elizabeth City; Syracuse Univ., 1932 | 1932 | 1936 |
| Hoggard, William A., GP, Manteo; Bowman Gray Sch. of Med., 1944 | 1944 | 1947 |
| Johnston, Wiley Warren, ObG, Manteo; N. C. Med. Coll., 1913 | 1913 | 1915 |
| Mann, Edward M., Moyock; Med. Coll. of Va., 1931 | 1932 | 1933 |
| Owens, Zack Doxey, S, Elizabeth City; Univ. of Md., 1930 | 1930 | 1940 |
| Parker, James Jarvis, GP, Elizabeth City; Temple, 1939 | 1939 | 1942 |
| Peters, William Anthony (Hon.), S, Elizabeth City; Med. Coll. of Va., 1915 | 1915 | 1916 |
| Peters, William Anthony, Jr., Elizabeth City; Duke, 1943 | 1944 | 1944 |
| Salters, Frederic Hay, OALR, Elizabeth City; Med. Coll. of S. C., 1935 | 1939 | 1940 |
| White, William Henry Clay, S, Elizabeth City; Univ. of Va., 1922 | 1929 | 1930 |
| Wright, C. N., GP, Jarvisburg; Temple, 1941 | 1941 | 1946 |

## PENDER COUNTY SOCIETY[57]

| | | |
|---|---|---|
| Wolfe, Nathan Carl, GP, Burgaw; Vanderbilt, 1929 | 1930 | 1944 |

## PERQUIMANS—SEE CHOWAN-PERQUIMANS

## PERSON COUNTY SOCIETY[58]

| | | |
|---|---|---|
| **President:** Hedgpeth, Emmett Martin, GP, Roxboro; Northwestern, 1936 | 1937 | 1938 |
| **Secretary:** Fitzgerald, John Dean, S, Roxboro; Duke, 1934 | 1934 | 1937 |
| Beam, Hugh Martin, GP, Roxboro; Columbia, 1918 | 1918 | 1919 |
| Gentry, George W. (Hon.), GP, Roxboro; Univ. of N. C., 1910 | 1910 | 1911 |
| Nichols, Austin Flint (Hon.), GP, Roxboro; Univ. of N. C., 1908 | 1908 | 1909 |
| Thaxton, Benjamin Adams (Hon.), GP, Roxboro; Jefferson, 1914 | 1914 | 1916 |

## PITT COUNTY SOCIETY[59]

| | | |
|---|---|---|
| **President:** Mewborn, John Moses, GP, Farmville; Med. Coll. of Va., 1932 | 1932 | 1935 |
| **Secretary:** Irons, C. Fred, GP, Greenville; Med. Coll. of Va., 1941 | 1946 | 1946 |
| Armistead, Drury Branch, I, Greenville; Med. Coll. of Va., 1931 | 1935 | 1936 |
| Aycock, Edwin Burtis, GP, Greenville; McGill Univ., 1936 | 1936 | 1940 |
| Barrett, John Milton, Ob, Greenville; Univ. of Pa., 1926 | 1926 | 1928 |
| Basnight, Thomas Gray (Hon.), GP, Greenville; Univ. of Md., 1904 | 1905 | 1907 |
| Beasley, Edward Bruce (Hon.), GP, Fountain; Univ. of Pa., 1911 | 1911 | 1915 |
| Brooks, Fred Philips, I, Greenville; Univ. of Mich., 1933 | 1933 | 1935 |
| Brown, William Moye Benjamin, ALR, Greenville; Med. Coll. of Va., 1929 | 1929 | 1931 |
| Crisp, Sellers Mark, Ob, Greenville; Univ. of Pa., 1923 | 1923 | 1926 |
| Dixon, George Grady (Hon.), GP, Ayden; Med. Coll. of Va., 1915 | 1915 | 1917 |
| Ennett, Nathaniel Thomas, PH, Beaufort; Med. Coll. of Va., 1907 | 1932 | 1934 |
| Fitzgerald, Charles Edmund, GP, Farmville; La. State Univ., 1937 | 1937 | 1940 |
| Frizzelle, Mark T. (Hon.), GP, Ayden; Univ. Coll. of Med., Richmond, 1907 | 1907 | 1907 |
| Garrenton, Connell, T, Bethel; Univ. of Pa., 1935 | 1935 | 1937 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Haar, Frederick Behrend, Pd, Greenville; Jefferson, 1932 | 1932 | 1935 |
| Hadley, Herbert W., Greenville; Bowman Gray Sch. of Med., 1943 | 1943 | 1947 |
| Hawes, James Beebe, OALR, Greenville; Univ. of Va., 1932 | 1937 | 1938 |
| Hoot, M. P., OALR, Greenville; Univ. of Oklahoma, 1934 | 1946 | 1947 |
| Irons, Maline G., P, Greenville; Med. Coll. of Va., 1941 | 1946 | 1946 |
| Moore, Davis Lee, GP, Winterville; Jefferson, 1936 | 1936 | 1938 |
| Mumford, A. M., Winterville; Jefferson, 1942 | 1942 | 1944 |
| Pace, Karl Busbee, GP, Greenville; Jefferson, 1914 | 1914 | 1920 |
| Pott, W. H., ObG, Greenville; Univ. of Va., 1917 | 1944 | 1944 |
| Smith, Joseph, ObG, Greenville; Med. Coll. of Va., 1914 | 1916 | 1920 |
| Smith, Randall Collins, Ayden; Jefferson, 1923 | 1923 | 1926 |
| Spiggle, Charles Harold, GP, Grimesland; Med. Coll. of Va., 1928 | 1928 | 1930 |
| Tucker, Earl Van, GP, Grifton; Med. Coll. of Va., 1930 | 1930 | 1935 |
| Tyson, John Joyner, Des Moines, Iowa; Med. Coll. of Va., 1928 | 1928 | 1930 |
| Williams, Roderick Thomas, GP, Farmville; Vanderbilt, 1937 | 1937 | 1942 |
| Winstead, John Lindsay, S, Greenville; Univ. of Md., 1925 | 1925 | 1930 |

## POLK COUNTY SOCIETY[60]

| | | |
|---|---|---|
| **President:** Palmer, Marion Cherigny (Hon.), Tryon; Med. Coll. of S. C., 1910 | 1911 | 1914 |
| **Secretary:** Durant, Cary T., Tryon; Med. Coll. of S. C. | 1941 | 1947 |
| Gilbert, Donald Roscoe, GP, Melvin Hill; Med. Coll. of Va., 1942 | 1943 | 1943 |
| Jervey, Allen Jones, S, Tryon; Med. Coll. of S. C., 1905 | 1923 | 1926 |
| Jervey, William St. Julien, Tryon; Temple, 1939 | 1939 | 1942 |
| Preston, John Zenas, GP, Tryon; Temple, 1934 | 1935 | 1937 |
| Woody, John Wycliffe Austin, Tryon; Univ. of Pa., 1937 | 1939 | 1940 |

## RANDOLPH COUNTY SOCIETY[61]

| | | |
|---|---|---|
| **President:** Barham, Berlin Francis, GP, Asheboro; Washington Univ., 1939 | 1939 | 1941 |
| **Secretary:** Woodruff, William E., S, Asheboro; Duke, 1940 | 1945 | 1946 |
| Barnes, Jesse Thomas, S, Asheboro; Med. Coll. of Va., 1929 | 1929 | 1932 |
| Barnes, Tiffany, GP, Asheboro; Med. Coll. of Va., 1925 | 1925 | 1927 |
| Burton, Herbert Walker, GP, Liberty; Med. Coll. of Va., 1941 | 1941 | 1943 |
| Cannon, Eugene Bolivia, Asheboro; Vanderbilt, 1937 | 1937 | 1941 |
| Craven, Franklin Clyde, Asheboro; Univ. of Md., 1913 | 1913 | 1914 |
| Dalton, Bennie Booker, GP, Asheboro; Duke, 1932 | 1933 | 1935 |
| Edmondson, Frank, Jr., GP, Asheboro; Temple, 1937 | 1937 | 1939 |
| Freeman, Alton Brown, GP, Randleman; Jefferson, 1929 | 1929 | 1947 |
| Fritz, Jacob Luther, ALR, Asheboro; Temple, 1936 | 1936 | 1938 |
| Griffin, Harvey Lee, GP, Asheboro; Med. Coll. of Va., 1926 | 1926 | 1928 |
| Helms, Thomas Leck, GP, Randleman; N. C. Med. Coll., 1914 | 1915 | 1917 |
| Joyner, George William, S, Asheboro; Duke, 1932 | 1937 | 1938 |
| Patterson, R. D., Liberty | | 1947 |
| Redding, John O., GP, Asheboro; Univ. of Pa., 1931 | 1931 | 1946 |
| Smith, Melvin Bowman, GP, Ramseur; Univ. of Pa., 1938 | 1938 | 1940 |
| Soady, John Hostley, Pd, Asheboro; Toronto Univ., 1905 | 1924 | 1926 |
| Sumner, George Herbert, PH, Asheboro; Tulane, 1923 | 1923 | 1924 |
| Sykes, Rufus Preston, S, Asheboro; Tulane, 1929 | 1929 | 1931 |

## RICHMOND COUNTY SOCIETY[62]

| | | |
|---|---|---|
| **President:** Parsons, William Herbert, GP, Ellerbe; N. C. Med. Coll., 1916 | 1916 | 1919 |
| **Secretary:** Henry, Tidal Boyce, I, Rockingham; Columbia, 1917 | 1920 | 1921 |
| Bristow, Charles Oliver, Pd, Rockingham; Jefferson, 1918 | 1920 | 1921 |
| Brown, Charles W., Hamlet; Georgetown Univ., 1937 | 1941 | 1946 |
| Garrett, Frank Bernard (Hon.), OALR, Rockingham; N. C. Med. Coll., 1912 | 1912 | 1914 |
| Garrison, Ralph Bernard, Ob, Hamlet; Univ. of Md., 1933 | 1933 | 1935 |
| Haines, Hilton D., ObG, Rockingham; George Washington Univ., 1934 | 1939 | 1947 |
| Harris, J. Robert, Rockingham; Baylor Univ., 1936 | 1946 | 1947 |
| Hatcher, Martin Armstead, U, Hamlet; Med. Coll. of Va., 1918 | 1920 | 1921 |
| Howell, William Lawrence (Hon.), GP, Ellerbe; N. C. Med. Coll., 1910 | 1910 | 1912 |
| †James, William Daniel (Hon.), S, Hamlet; Jefferson, 1908 | 1908 | 1910 |
| James, William Duer, S, Hamlet; La. State Med. Center, 1941 | 1941 | 1942 |
| Long, Zachary Fillmore, Pd, Rockingham; Univ. of Pa., 1928 | 1928 | 1930 |
| McIntosh, William Rufus, GP, Rockingham; N. C. Med. Coll., 1913 | 1916 | 1917 |
| Milham, Claude Gilbert, T, Hamlet; Jefferson, 1927 | 1927 | 1930 |
| Morris, Thomas A., Jr., GP, Hamlet; Univ. of Pa., 1941 | 1941 | 1947 |
| Nicholson, Neill Graham, Sr., OALR, Rockingham; N. C. Med. Coll., 1917 | 1917 | 1920 |
| Terry, William Calvin (Hon.), GP, Hamlet; N. C. Med. Coll., 1911 | 1912 | 1914 |
| Webb, William P. (Hon.), GP, Rockingham; Med. Coll. of S. C., 1897 | 1897 | 1904 |

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† Deceased.

## ROBESON COUNTY SOCIETY[63]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Croom, Robert DeVane, Jr., GP, Maxton; Med. Coll. of Va., 1934 | 1934 | 1937 |
| **Secretary:** Hedgpeth, Louten Rhodes, OALR, Lumberton; Univ. of Md., 1933 | 1933 | 1934 |
| Allen, George Calvin, OALR, Lumberton; Rush Med. Coll., 1932 | 1933 | 1934 |
| Bender, John Joseph, GP, Red Springs; Coll. of P. & S., Boston, 1935 | 1937 | 1939 |
| Benson, Norman Oliver, U, Lumberton; Univ. of Ga., 1930 | 1933 | 1934 |
| Biggs, John Irvin, S, Lumberton; Northwestern, 1932 | 1937 | 1938 |
| Bowman, Earle Ledbetter (Hon.), GP, Lumberton; Med. Coll. of Va., 1914 | 1914 | 1916 |
| Britt, James Norment, GP, Lumberton; Atlanta Med. Coll., 1914 | 1923 | 1924 |
| Bullock, Duncan Douglas, GP, Rowland; Med. Coll. of S. C., 1920 | 1927 | 1939 |
| Currie, Daniel Smith (Hon.), GP, Parkton; N. C. Med. Coll., 1906 | 1906 | 1906 |
| Fagan, Philip, GP, Fairmont; Univ. of Creighton, 1942 | 1946 | 1947 |
| Ford, Fred, GP, Maxton; Med. Coll. of S. C., 1938 | 1946 | 1946 |
| Gibson, F. D., Jr., GP, Fairmont; Emory, 1940 | 1940 | 1946 |
| Hardin, Eugene Ramsay, PH, Lumberton; Univ. of Ga., 1911 | 1915 | 1920 |
| Hayes, James, GP, Fairmont; Med. Coll. of S. C., 1937 | 1938 | 1946 |
| Hedgpeth, William Carey, ObG, Lumberton; Northwestern, 1933 | 1933 | 1936 |
| Hodgin, Henry Hiram (Hon.), GP, Red Springs; N. C. Med. Coll., 1906 | 1906 | 1906 |
| Holmes, Andrew Byron (Hon.), GP, Fairmont; Jefferson, 1910 | 1910 | 1914 |
| Johnson, Charles Thomas, GP, Red Springs; Jefferson, 1920 | 1920 | 1922 |
| Kinlaw, J. B., GP, Rowland; Temple, 1943 | 1943 | 1947 |
| Kinlaw, Murray Carlyle, GP, Pembroke; Temple, 1935 | 1936 | 1937 |
| Knox, John (Hon.), GP, Lumberton; Univ. of Md., 1906 | 1907 | 1907 |
| Martin, James Alfred (Hon.), Pd, Lumberton; Med. Coll. of Va., 1915 | 1915 | 1917 |
| McAllister, Hugh Alexander, ObG, Lumberton; Duke, 1937 | 1937 | 1940 |
| McClelland, Joseph O. (Hon.), GP, Maxton; Med. Coll. of Va., 1908 | 1912 | 1913 |
| McGrath, Frank Bernard, Pd, Lumberton; Northwestern, 1933 | 1937 | 1938 |
| McIntyre, Stephen, S, Lumberton; Jefferson, 1928 | 1928 | 1930 |
| McMillan, Roscoe Drake (Hon.), GP, Red Springs; Univ. of Md., 1910 | 1911 | 1912 |
| Mees, Theodore H., I, Lumberton; Duke, 1942 | 1946 | 1946 |
| Nash, John Frederick (Hon.), GP, St. Pauls; N. C. Med. Coll., 1914 | 1914 | 1916 |
| Parker, James Roy, OALR, Lumberton; N. C. Med. Coll., 1917 | 1917 | 1943 |
| Parsons, L. J., GP, Lumberton; N. Y. Univ., 1942 | 1943 | 1946 |
| Ricks, Leonard E. (Hon.), GP, Fairmont; Med. Coll. of Va., 1896 | 1896 | 1898 |
| Smith, John McNeill (Hon.), GP, Rowland; Jefferson, 1908 | 1908 | 1909 |
| Townsend, Robert Glenn, GP, St. Pauls; Tulane, 1927 | 1927 | 1934 |
| Ward, Frank P., I, Lumberton; Med. Coll. of S. C., 1943 | 1943 | 1944 |
| Weinstein, Morton Hannah, GP, Fairmont; Northwestern, 1936 | 1937 | 1938 |
| Weinstein, Rayford Lee, GP, Fairmont; Jefferson, 1936 | 1936 | 1938 |
| Wrenn, S. M., S&G, Lumberton; Med. Coll. of S. C., 1930 | 1930 | 1944 |

## ROCKINGHAM COUNTY SOCIETY[64]

| | | |
|---|---|---|
| **President:** Lineberry, John Alson, PH, Mayodan; Univ. of Pa., 1938 | 1938 | 1940 |
| **Secretary:** Beach, William R., GP, Madison; Emory, 1934 | 1934 | 1935 |
| Carter, Paul Conway, GP, Madison; Univ. of Md., 1916 | 1916 | 1920 |
| Casteen, Kenan, OALR, Leaksville; N. Y. Univ., 1918 | 1919 | 1921 |
| Cox, Alexander McNeill, GP, Madison; Med. Coll. of Va., 1932 | 1932 | 1938 |
| Cozart, Benjamin Franklin, Reidsville; Med. Coll. of Va., 1931 | 1931 | 1931 |
| Cummings, Michael Penn (Hon.), GP, Reidsville; Jefferson, 1911 | 1911 | 1913 |
| Dillard, George Penn, Draper; Bennett Med. Coll., 1916 | 1916 | 1919 |
| Drake, Benjamin Michael, PH, Leaksville; Vanderbilt, 1931 | 1931 | 1941 |
| Ferneyhough, William Todd, OALR, Reidsville; Univ. of Md., 1916 | 1926 | 1927 |
| Fetzer, Paul William, GP, Reidsville; Univ. of Va., 1916 | 1916 | 1920 |
| Forbes, Thomas Earl, GP, Reidsville; Jefferson, 1940 | 1940 | 1942 |
| Fulp, James Francis, GP, Stoneville; Duke, 1935 | 1937 | 1940 |
| Harris, Russell P., S, Leaksville; Univ. of Louisville, 1943 | 1943 | 1947 |
| Hester, William Shepherd, S, Reidsville; Jefferson, 1926 | 1929 | 1930 |
| Johnson, William Alexander (Hon.), GP, Reidsville; N. C. Med. Coll., 1907 | 1909 | 1910 |
| Klenner, Fred Robert, Reidsville; Duke, 1936 | 1937 | 1940 |
| Matthews, William W. (Hon.), GP, Leaksville; Chicago Coll. of Med. & Surg., 1913 | 1915 | 1916 |
| McAnally, James McGehee, S, Reidsville; Univ. of Pa., 1927 | 1927 | 1928 |
| McBride, M. H. (Hon.), Reidsville; Univ. Coll. of Med., Richmond, 1901 | 1901 | 1904 |
| Moricle, Charles Hunter, S, Reidsville; Univ. of Md., 1939 | 1939 | 1942 |
| Pace, Samuel Eugene, GP, Leaksville; Jefferson, 1932 | 1932 | 1939 |
| Ray, John B. (Hon.), GP, Leaksville; Baltimore Med. Coll., 1898 | 1898 | 1898 |
| Reynolds, Ernest Harold, GP, Reidsville; N. Y. Univ., 1935 | 1935 | 1936 |
| Rucer, A. W., GP, Spray; Univ. of Tenn., 1936 | 1936 | 1947 |
| Stone, John S., GP, Leaksville; Jefferson, 1942 | 1942 | 1947 |
| Tuttle, Andrew Frier (Hon.), GP, Spray; N. C. Med. Coll., 1901 | 1901 | 1906 |
| Tyner, Carl Vann, S, Leaksville; N. Y. Univ., 1916 | 1916 | 1919 |
| Wilson, Newton Graves (Hon.), GP, Madison; N. C. Med. Coll., 1914 | 1914 | 1915 |

## ROWAN-DAVIE COUNTIES SOCIETY[65]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Mock, Charles Glenn, Salisbury; Univ. of Pa., 1935 | 1935 | 1938 |
| **Secretary:** Wright, R. B., Jr., Salisbury; Tulane, 1942 | 1942 | 1947 |
| Armstrong, Charles Wallace (Hon.), PH, Salisbury; Univ. of Md., 1914 | 1914 | 1915 |
| Black, Oscar Reid, GP, Landis; N. C. Med. Coll., 1914 | 1914 | 1918 |
| Brown, Clarence Emanuel, GP, Faith; N. C. Med. Coll., 1918 | 1920 | 1921 |
| Brown, James Arthur, Ob, Cleveland; Tulane, 1934 | 1934 | 1938 |
| Busby, George Francis, S, Salisbury; Johns Hopkins, 1932 | 1932 | 1936 |
| Busby, Julian Goode (Hon.), Pr&D, Salisbury; Univ. of Md., 1904 | 1904 | 1905 |
| Choate, Glenn, Salisbury; N. C. Med. Coll., 1909 | 1909 | 1909 |
| Choate, James Walter, GP, Salisbury; N. C. Med. Coll., 1915 | 1915 | 1924 |
| Clement, Edward Buehler (Hon.), OALR, Salisbury; Jefferson, 1906 | 1906 | 1906 |
| Coffey, James Cecil, Ind, Salisbury; Emory, 1937 | 1937 | 1940 |
| Eagle, James Carr, GP, Spencer; Jefferson, 1923 | 1923 | 1925 |
| Feezor, C. N., GP, Salisbury; Temple, 1937 | 1937 | 1947 |
| Field, Bob Lewis, GP, Salisbury; Med. Coll. of Va., 1931 | 1933 | 1939 |
| Frazier, John Wesley, Jr., Salisbury; Jefferson, 1924 | 1924 | 1927 |
| Greene, Garland V., GP, Mocksville; Med. Coll. of Va., 1916 | 1916 | 1923 |
| Harding, Samuel Asberry (Hon.), GP, Mocksville; N. C. Med. Coll., 1910 | 1910 | 1913 |
| Kavanagh, William Paul, Cooleemee; Duke, 1935 | 1938 | 1939 |
| Ketchie, James Meredith, Salisbury; Jefferson, 1922 | 1922 | 1925 |
| Little, J. R., OALR, Salisbury; Jefferson, 1942 | 1942 | 1947 |
| Long, William Matthews, S, Mocksville; Tulane, 1933 | 1934 | 1934 |
| Lowery, John Robert (Hon.), Salisbury; Univ. of Md., 1904 | 1904 | 1913 |
| Marsh, Frank Baker, I, Salisbury; Jefferson, 1919 | 1919 | 1922 |
| McCutchan, Frank, OALR, Salisbury; Univ. of Va., 1920 | 1927 | 1928 |
| McKenzie, Benjamin Whitehead, S, Salisbury; Jefferson, 1916 | 1916 | 1920 |
| Monk, Henry Lawrence (Hon.), Salisbury; Med. Coll. of Va., 1899 | 1899 | 1903 |
| Newman, Harold Hastings (Hon.), S, Salisbury; Johns Hopkins, 1913 | 1914 | 1916 |
| Oliver, Joseph Andrew, GP, Rockwell; Coll. of Med. Evangelists, 1933 | 1935 | 1937 |
| Peeler, John H. (Hon.), Ob, Salisbury; Univ. Coll. of Med., Richmond, 1899 | 1899 | 1904 |
| Plyler, Ralph Johnson, S, Salisbury; Univ. of Md., 1921 | 1924 | 1925 |
| Robertson, Lloyd Harvey, Salisbury; Univ. of Pa., 1929 | 1929 | 1931 |
| Scott, Allan F., Salisbury; Univ. of Tenn., 1943 | 1943 | 1947 |
| Seay, Thomas Waller, GP, Spencer; Univ. of Md., 1921 | 1922 | 1924 |
| Shafer, Irving Everett (Hon.), Ob, Salisbury; N. C. Med. Coll., 1914 | 1914 | 1914 |
| Shinn, G. C., China Grove; Univ. of Md., 1933 | 1933 | 1940 |
| Smith, Jay L., GP, Spencer; Jefferson, 1942 | 1942 | 1946 |
| Spencer, Frederick Brunell (Hon.), Salisbury; Univ. of N. C., 1909 | 1909 | 1911 |
| Whicker, Max Evans, GP, China Grove; Univ. of Md., 1932 | 1932 | 1934 |
| Woodson, Charles Whitehead (Hon.), GP, Salisbury; Columbia Univ., 1904 | 1905 | 1907 |
| Wyatt, Hubert Lee, GP, China Grove; Med. Coll. of Va., 1916 | 1924 | 1925 |

## RUTHERFORD COUNTY SOCIETY[66]

| | | |
|---|---|---|
| **President:** Mitchell, Landis Patterson, Spindale; Washington Univ., 1938 | 1940 | 1941 |
| **Secretary:** Glenn, Charles Foster, S, Rutherfordton; Univ. of Louisville, 1914 | 1927 | 1928 |
| Abernethy, Paul McBee, Rutherfordton; Bowman Gray Sch. of Med., 1943 | 1943 | 1947 |
| Bass, Beaty Lee, S, Rutherfordton; Tulane, 1939 | 1939 | 1943 |
| Biggs, Montgomery Herman (Hon.), S, Rutherfordton; Univ. of Pa., 1897 | 1907 | 1908 |
| Bostic, William Chivous (Hon.), Ind, Forest City; N. C. Med. Coll., 1905 | 1905 | 1905 |
| Bostic, William Chivous, Jr., Forest City; Univ. of Pa., 1926 | 1926 | 1927 |
| Crawford, Robert Hope, S, Rutherfordton; Johns Hopkins, 1914 | 1920 | 1921 |
| Eaves, Rupert Spencer, S, Rutherfordton; Med. Coll. of Va., 1932 | 1932 | 1933 |
| Elliott, William McBrayer, GP, Forest City; Univ. of Ga., 1934 | 1934 | 1935 |
| Harrill, Lawson Baxter (Hon.), S, Caroleen; Chattanooga Med. Coll., 1897 | 1902 | 1904 |
| Head, William Thomas, GP, Melvin Hill; Atlanta Coll. of P. & S., 1911 | 1911 | 1923 |
| Hendrick, Harry V., Rutherfordton; Johns Hopkins, 1943 | 1947 | 1947 |
| Hunt, James F. (Hon.), GP, Spindale; Univ. of Tenn., 1900 | 1900 | 1912 |
| Lampley, Charles Gordon, Rutherfordton; Bowman Gray Sch. of Med., 1946 | 1946 | 1947 |
| Logan, Frank William Hicks, Rutherfordton; N. C. Med. Coll., 1916 | 1916 | 1919 |
| Lovelace, Thomas Claude, GP, Henrietta; N. C. Med. Coll., 1917 | 1920 | 1920 |
| Mills, Hugh H., Forest City; Harvard, 1940 | 1940 | 1946 |
| Moss, George Oran, Ind, Cliffside; Emory, 1927 | 1927 | 1929 |
| Ramsaur, Jackson Townsend, OALR, Rutherfordton; Univ. of Chicago, 1933 | 1934 | 1935 |
| Rucker, Adin Adam (Hon.), GP, Rutherfordton; Univ. of Md., 1908 | 1908 | 1909 |
| Verner, Carl Hugh, Pd, Forest City; Atlanta Coll. of P. & S., 1912 | 1923 | 1927 |
| Washburn, Benjamin Earl, PH, Rutherfordton; Univ. of Va., 1911 | 1912 | 1917 |
| Wiseman, Perry Haynes, GP, Avondale; Med. Coll. of Va., 1925 | 1925 | 1926 |

## SAMPSON COUNTY SOCIETY[67]

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| **President:** Ayers, James Salisbury, GP, Clinton; Jefferson, 1932 | 1932 | 1937 |
| **Secretary:** Newman, Glenn C., I, Clinton; Duke, 1939 | 1946 | 1946 |
| Best, Glenn Eben, GP, Clinton; Temple, 1938 | 1938 | 1940 |
| Brewer, James Street, GP, Roseboro; Jefferson, 1919 | 1919 | 1921 |
| Crumpler, Paul (Hon.), GP, Clinton; Univ. of Tenn., 1907 | 1907 | 1908 |
| Johnson, Amos Neill, GP, Garland; Univ. of Pa., 1933 | 1933 | 1935 |
| Kendall, John Harold, GP, Clinton; Coll. of Med. Evangelists, 1934 | 1935 | 1935 |
| Lee, J. Marshall, GP, Newton Grove; Med. Coll. of Va., 1916 | 1920 | 1923 |
| Parker, Oscar Lee, OALR, Clinton; Med. Coll. of Va., 1918 | 1918 | 1919 |
| Royal, Donnie Martin, GP, Salemburg; Med. Coll. of Va., 1926 | 1926 | 1928 |
| Sessoms, Edwin Tate (Hon.), GP, Roseboro; N. C. Med. Coll., 1915 | 1915 | 1917 |
| Sikes, Gibson L. (Hon.), GP, Salemburg; Univ. Coll. of Med., Richmond, 1900 | 1900 | 1902 |
| Sloan, William Henry, GP, Garland; Univ. of Md., 1916 | 1916 | 1920 |
| Small, Victor Roy, GP, Clinton; Ohio State Univ., 1916 | 1920 | 1921 |
| Starling, Wyman Plato, R, Roseboro; Med. Coll. of Va., 1933 | 1933 | 1936 |

## SCOTLAND COUNTY SOCIETY[68]

| | | |
|---|---|---|
| **President:** Buchanan, Luther Thomas (Hon.), GP, Laurinburg; Jefferson, 1913 | 1913 | 1914 |
| **Secretary:** Creed, George O., GP, Wagram; Med. Coll. of S. C., 1942 | 1946 | 1946 |
| Erwin, E. A., GP, Laurinburg; Jefferson, 1943 | 1943 | 1946 |
| James, Fairley Patterson (Hon.), GP, Laurinburg; Univ. of Pa., 1916 | 1916 | 1917 |
| Livingston, Everett Alexander (Hon.), GP, Gibson; Univ. of Md., 1912 | 1912 | 1913 |
| Moore, Kinchen Carl, PH, Laurinburg; Univ. of Mich., 1909 | 1909 | 1910 |
| Pate, James Gibson, GP, Gibson; Univ. of Pa., 1916 | 1916 | 1918 |
| Patterson, F. M. Simmons, S, Laurinburg; Univ. of Pa., 1939 | 1939 | 1947 |
| Richardson, J. J., S, Laurinburg; Temple, 1942 | 1947 | 1947 |
| Summerlin, Harry, GP, Laurinburg; Med. Coll. of S. C., 1933 | 1933 | 1935 |
| Wilkes, Marcus Branch, GP, Laurinburg; N. C. Med. Coll., 1912 | 1923 | 1923 |
| Womble, Edwin C., GP, Wagram; Med. Coll. of S. C., 1942 | 1942 | 1947 |

## STANLEY COUNTY SOCIETY[69]

| | | |
|---|---|---|
| **President:** Gaskin, Madge Baker, G, Albemarle; Med. Coll. of S. C., 1926 | 1933 | 1934 |
| **Secretary:** Wall, G. Ritchie, GP, Albemarle; Duke, 1940 | 1940 | 1946 |
| Allen, Joseph A. (Hon.), GP, New London; Univ. Coll. of Med., Richmond, 1901 | 1901 | 1904 |
| Brunson, Edward Porcher, S, Albemarle; Jefferson, 1921 | 1922 | 1934 |
| Caldwell, D. G., T, Albemarle; Univ. of Pa., 1923 | 1925 | 1925 |
| Dunlap, Lucius Victor (Hon.), GP, Albemarle; Univ. of N. C., 1909 | 1909 | 1910 |
| Fox, Dennis Bryan, S, Albemarle; Vanderbilt, 1937 | 1937 | 1941 |
| Gaskin, John Stover, GP, Albemarle; Med. Coll. of S. C., 1925 | 1929 | 1931 |
| Gaskin, Lewis Roy, GP, Albemarle; Med. Coll. of S. C., 1921 | 1924 | 1926 |
| Harris, Loftin, GP, Norwood; Univ. Coll. of Med., Richmond, 1942 | 1942 | 1947 |
| Hill, William Henry, GP, Albemarle; Bowman Gray Sch. of Med., 1944 | 1944 | 1946 |
| Hill, William Isaac (Hon.), GP, Albemarle; Univ. of Md., 1897 | 1897 | 1904 |
| Lapsley, Alberti Fraser, GP, Badin; Med. Coll. of Va., 1933 | 1936 | 1937 |
| Laton, James Franklin (Hon.), OALR, Albemarle; N. C. Med. Coll., 1904 | 1904 | 1910 |
| McKenzie, Wayland Nash, PH, Albemarle; Med. Coll. of Va., 1935 | 1935 | 1937 |
| McLendon, Walter, GP, Oakboro; Med. Coll. of Va. | 1941 | 1947 |
| McLeod, William Louis, GP, Norwood; Temple, 1938 | 1938 | 1940 |
| Moore, Donald Bain (Hon.), Ind, Badin; Univ. Coll. of Med., Richmond, 1913 | 1913 | 1915 |
| Outlaw, Jackson Kent, OALR, Albemarle; Syracuse Univ., 1923 | 1926 | 1934 |
| Shaver, William Trantham, S, Albemarle; Univ. of Md., 1918 | 1920 | 1921 |
| Tally, Bailey Thomas, S, Albemarle; Jefferson, 1921 | 1921 | 1922 |

## SURRY-YADKIN COUNTIES SOCIETY[70]

| | | |
|---|---|---|
| **President:** Brandon, Henry Allen, GP, Yadkinville; Syracuse Univ., 1935 | 1935 | 1940 |
| **Secretary:** Sykes, Ralph Judson, PH, Mt. Airy; Med. Coll. of Va., 1934 | 1936 | 1936 |
| Abernethy, Olivia, GP, Elkin; Med. Coll. of Va., 1940 | 1940 | 1942 |
| Ashby, Edward Clayton (Hon.), S, Mt. Airy; Univ. of Pa., 1914 | 1914 | 1916 |
| Beale, Seth McPherson, GP, Elkin; Tulane, 1935 | 1936 | 1938 |
| Bell, Spencer Alexander, GP, Hamptonville; Northwestern, 1935 | 1935 | 1938 |
| Britt, Tilman Carlisle, PH, Mount Airy; Jefferson, 1921 | 1921 | 1925 |
| Caldwell, Robert Manfred, Ob, Mt. Airy; Univ. of Va., 1936 | 1938 | 1940 |
| Cook, Ralph M., GP, Elkin; Univ. of Louisville, 1940 | 1946 | 1947 |
| Finney, Jonathan Richard, Boonville; N. C. Med. Coll., 1910 | 1910 | 1911 |
| Flippin, James Meigs (Hon.), GP, Pilot Mountain; Coll. of P. & S., Baltimore, 1884 | 1893 | 1900 |
| Flippin, Samuel T. (Hon.), GP, Siloam; N. C. Med. Coll., 1898 | 1898 | 1898 |
| Folger, Paul Bernays, GP, Dobson; Jefferson, 1922 | 1922 | 1924 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Franklin, Robert Benjamin Clinton, PH, Mt. Airy; Queen's Univ., Kingston, Ontario, 1931 | 1938 | 1940 |
| Gambill, Ira Samuel, Elkin; N. C. Med. Coll., 1912 | 1912 | 1917 |
| Harding, B. H., Brooks Cross Roads; Univ. of Va., 1934 | 1934 | 1935 |
| Johnson, Harry Lester, GP, Elkin; Univ. of Cincinnati, 1924 | 1924 | 1927 |
| Johnson, Jeremiah Robert, S, Elkin; Med. Coll. of Va., 1927 | 1927 | 1929 |
| Jolley, John William, OALR, Elkin; Univ. of Cinn., 1935 | 1939 | 1941 |
| Lovill, Robert Jones (Hon.), GP, Mt. Airy; Univ. of Md., 1910 | 1910 | 1912 |
| Martin, Moir Saunders (Hon.), S, Mt. Airy; Univ. Coll. of Med., Richmond, 1905 | 1909 | 1916 |
| Mitchell, Roy Colonel, I, Mt. Airy; Univ. of Pa., 1919 | 1921 | 1923 |
| Royall, M. A. (Hon.), OALR, Elkin; Coll. of P. & S., Baltimore, 1885 | 1889 | 1904 |
| Salmons, Henry Clay (Hon.), GP, Elkin; N. C. Med. Coll., 1904 | 1904 | 1908 |
| Smith, Robert Edwin, Mt. Airy; Univ. of Pa., 1923 | 1923 | 1926 |
| Sykes, Charlie Louis, GP, Pilot Mountain; Georgetown Univ., 1938 | 1938 | 1939 |
| Taylor, Vernon Williams, Jr., I, Elkin; Jefferson, 1938 | 1938 | 1941 |
| Woltz, John Louis (Hon.), Mt. Airy; Southern Med. Coll., 1897 | 1902 | 1904 |
| Wood, William L., GP, Boonville; Bowman Gray Sch. of Med., 1945 | 1945 | 1947 |

## SWAIN—SEE JACKSON-SWAIN

## TRANSYLVANIA COUNTY SOCIETY[71]

| | | |
|---|---|---|
| **President:** Osborne, Joseph Evans, S, Rosman; Med. Coll. of Va., 1930 | 1930 | 1930 |
| **Secretary:** Allen, Joe W., OALR, Brevard; Tulane, 1944 | 1944 | 1947 |
| Newland, Charles Logan, S, Brevard; Med. Coll. of Va., 1927 | 1928 | 1932 |
| Sader, Julius, Brevard; N. Y. Univ., 1928 | 1938 | 1939 |
| Webster, Ben, Oph, Brevard; Georgetown Univ., 1900 | 1942 | 1942 |
| Wilkerson, Jesse Bert, GP, Brevard; Memphis Hospital Med. Coll., 1906 | 1923 | 1925 |

## TYRRELL—SEE MARTIN-WASHINGTON-TYRRELL

## UNION COUNTY SOCIETY[72]

| | | |
|---|---|---|
| **President:** Neese, Kenneth Earle, GP, Monroe; Washington Univ., 1929 | 1929 | 1934 |
| **Secretary:** Love, William Marshall, GP, Monroe; N. C. Med. Coll., 1915 | 1915 | 1919 |
| Bolt, Conway Anderson, GP, Marshville; Med. Coll. of S. C., 1926 | 1929 | 1930 |
| Erb, Norris Scribner, GP, Monroe; Med. Coll. of Va., 1944 | 1946 | 1947 |
| Faulk, James Grady, S, Monroe; Med. Coll. of Va., 1931 | 1931 | 1932 |
| Garren, Robert Hall (Hon.), OALR, Monroe; Univ. of Nashville, 1900 | 1901 | 1904 |
| Goudelock, John Jeffries, U, Monroe; Med. Coll. of S. C., 1923 | 1924 | 1924 |
| Ham, Clem, PH, Monroe; Med. Coll. of S. C., 1926 | 1929 | 1930 |
| Hamer, Eugene F., GP, Monroe; Med. Coll. of S. C., 1941 | 1941 | 1946 |
| McLeod, John Purl Utley, U, Marshville; Coll. of Med. Evangelists, 1939 | 1939 | 1940 |
| Ormand, John William, ALR, Monroe; Univ. of Cincinnati, 1926 | 1926 | 1928 |
| Smith, George Marvin, GP, Monroe; N. C. Med. Coll., 1914 | 1914 | 1919 |
| Whitt, Walter Fulton, Jr., Monroe; Duke, 1942 | 1946 | 1946 |
| Williams, Edward Jerome, GP, Monroe; N. Y. Univ., 1917 | 1920 | 1921 |

## VANCE COUNTY SOCIETY[73]

| | | |
|---|---|---|
| **President:** Noel, William Walker, S, Henderson; Johns Hopkins, 1929 | 1939 | 1940 |
| **Secretary:** Rollins, Charles Dick, Henderson; Univ. of Pa., 1935 | 1935 | 1939 |
| Bass, Harris Hartwell, Ob, Henderson; Univ. of Pa., 1928 | 1929 | 1930 |
| Fenner, Edwin Ferebee (Hon.), Henderson; Univ. of Md., 1905 | 1906 | 1907 |
| Furman, William H. (Hon.), Henderson; Jefferson, 1910 | 1910 | 1913 |
| Newcomb, Andrew Purefoy, Jr., GP, Henderson; Jefferson, 1922 | 1922 | 1924 |
| Newell, Hodge Albert (Hon.), OALR, Henderson; Coll. of P. & S., Baltimore, 1906 | 1906 | 1906 |
| Rollins, Vance Benton, Henderson; Univ. of Pa., 1932 | 1932 | 1936 |
| Upchurch, Robert T. (Hon.), Henderson; Jefferson, 1908 | 1908 | 1910 |
| Wheeler, James Hartwick, GP, Henderson; Jefferson, 1918 | 1918 | 1920 |
| White, Clarence Hunt, Oph, Henderson; Tulane, 1928 | 1930 | 1935 |

## WAKE COUNTY SOCIETY[74]

| | | |
|---|---|---|
| **President:** Wilkinson, C. T., Wake Forest; Tulane, 1922 | 1922 | 1923 |
| **Secretary:** Hitch, Joseph Martin, D, Raleigh; Univ. of Va., 1933 | 1938 | 1939 |
| Ashby, Julian Warrington, PN, Raleigh; Univ. of Md., 1905 | 1921 | 1922 |
| Barbee, George S. (Hon.), GP, Zebulon; Univ. of N. C., 1910 | 1910 | 1912 |
| Blackwelder, R. G., NP, Raleigh; Med. Coll. of Va., 1932 | 1932 | 1945 |
| Bolus, Michael, D, Raleigh; Jefferson, 1934 | 1934 | 1938 |
| Branaman, Guy Hewitt, ObG, Raleigh; Med. Coll. of Va., 1939 | 1947 | 1947 |
| Brian, Earl Winfrey, I, Raleigh; Duke, 1934 | 1936 | 1939 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Broughton, Arthur Calvin, Jr., GP, Raleigh; Med. Coll. of Va., 1937 | 1937 | 1939 |
| Buffalo, J. S. (Hon.), GP, Garner; Baltimore Med. Coll., 1900 | 1900 | 1904 |
| Bugg, Charles Richard, Pd, Raleigh; Johns Hopkins, 1922 | 1924 | 1926 |
| Bulla, Alexander Chester, PH, Raleigh; N. C. Med. Coll., 1915 | 1915 | 1918 |
| Caveness, William F., N, Raleigh; McGill Univ., 1943 | 1945 | 1946 |
| Caveness, Zebulan Marvin (Hon.), Pr, Raleigh; Univ. of N. C., 1903 | 1903 | 1903 |
| Caviness, Verne Strudwick, I, Raleigh; Jefferson, 1921 | 1921 | 1926 |
| Chesson, Andrew L., S, Raleigh; Univ. of Md., 1936 | 1936 | 1946 |
| Clark, Lintner, R, Raleigh; Indiana Univ., 1937 | 1941 | 1946 |
| †Coleman, George Stephenson (Hon.), Pr, Raleigh; Med. Coll. of Va., 1907 | 1907 | 1908 |
| Combs, Joseph John, I, Raleigh; Columbia, 1926 | 1926 | 1929 |
| Cooper, George Marion (Hon.), PH, Raleigh; Univ. Coll. of Med., Richmond, 1905 | 1905 | 1906 |
| Corbin, George W., Jr., GP, Wake Forest; Univ. of Pa., 1943 | 1943 | 1947 |
| Cozart, Wiley Simon (Hon.), GP, Fuquay Springs; Med. Coll. of Va., 1914 | 1914 | 1917 |
| Crumpler, Amos Gilmore, GP, Fuquay Springs; Temple, 1936 | 1936 | 1938 |
| Dewar, William Banks, I, Raleigh; Univ. of Pa., 1920 | 1920 | 1923 |
| Dickinson, Kenneth D., Ob, Raleigh; Univ. of Minn., 1932 | 1935 | 1936 |
| Eldridge, Charles Patterson, GP, Raleigh; Univ. of Pa., 1926 | 1926 | 1928 |
| Fields, James Armstead, South Boston, Va.; Med. Coll. of Va., 1917 | 1941 | 1941 |
| Finch, Ollie Edwin (Hon.), I, Raleigh; Jefferson, 1915 | 1915 | 1917 |
| Flowers, Charles Ely (Hon.), ObG, Zebulon; Med. Coll. of Va., 1913 | 1915 | 1916 |
| Fox, Powell Graham, U, Raleigh; Med. Coll. of Va., 1922 | 1923 | 1929 |
| Fox, Robert Eugene, PH, Raleigh; Univ. of Pa., 1926 | 1926 | 1929 |
| Freeman, Robert Herman, GP, Raleigh; Jefferson, 1908 | 1908 | 1919 |
| Gibson, Milton Reynolds (Hon.), OALR, Raleigh; Univ. of Md., 1905 | 1905 | 1906 |
| Goodwin, Oscar Sexton, GP, Apex; Jefferson, 1923 | 1923 | 1926 |
| Hamilton, Alfred T., S, Raleigh; Harvard, 1936 | 1945 | 1946 |
| Hamilton, John Homer, PH, Raleigh; Harvard, 1916 | 1926 | 1926 |
| Haywood, Hubert Benbury (Hon.), I, Raleigh; Univ. of Pa., 1909 | 1909 | 1910 |
| Herring, Edward Humphrey, GP, Raleigh; Univ. of Pa., 1930 | 1930 | 1934 |
| Hester, Joseph Robert, GP, Wendell; Univ. of N. C., 1910 | 1910 | 1911 |
| Hicks, Vonnie Monroe, Oph, Raleigh; Jefferson, 1918 | 1918 | 1922 |
| Hill, Millard Daniel, D, Raleigh; Med. Coll., of Va., 1928 | 1928 | 1931 |
| Horton, Miles Christopher (Hon.), GP, Raleigh; Univ. Coll. of Med., Richmond, 1903 | 1911 | 1912 |
| Horton, William Calvin (Hon.), Pr, Raleigh; Coll. of P. & S., Baltimore, 1897 | 1896 | 1904 |
| Horton, William H., GP, Wendell; Boston Univ., 1940 | 1946 | 1946 |
| Hunter, John Pullen, GP, Cary; Jefferson, 1919 | 1919 | 1921 |
| Irmen, F. A., NP, Raleigh; George Washington Univ., 1911 | 1931 | 1947 |
| Judd, Glenn Ballentine, GP, Varina; Vanderbilt, 1932 | 1934 | 1935 |
| †Judd, James M. (Hon.), GP, Varina; Baltimore Med. Coll., 1897 | 1897 | 1901 |
| Kitchin, Thurman D. (Hon.), Ed, Wake Forest; Jefferson, 1908 | 1908 | 1908 |
| Kleiman, David, I, Raleigh; Univ. of Ill., 1934 | 1946 | 1946 |
| Lane, Bessie Evans, I, Raleigh; Woman's Med. Coll. of Pa., 1921 | 1921 | 1926 |
| Lawrence, Benjamin Jones, S, Raleigh; Jefferson, 1918 | 1918 | 1920 |
| Liles, Lonnie Carl, GP, Raleigh; Med. Coll. of Va., 1930 | 1930 | 1933 |
| Mackie, George Carlyle, GP, Wake Forest; Univ. of Pa., 1928 | 1928 | 1932 |
| Martin, Thomas Adrian, Oph, Raleigh; Univ. of Md., 1931 | 1939 | 1941 |
| McGee, Robert Louis, S, Raleigh; Univ. of Pa., 1932 | 1932 | 1935 |
| McLeod, Neill Henry, Jr., GP, Raleigh; Univ. of Pa., 1930 | 1930 | 1932 |
| McManus, Hugh Forrest, Jr., GP, Raleigh; Med. Coll. of S. C., 1938 | 1938 | 1941 |
| Mitchener, James Samuel (Hon.), OALR, Raleigh; Johns Hopkins, 1915 | 1915 | 1917 |
| Neal, J. Walter, S, Raleigh; Tulane, 1932 | 1934 | 1935 |
| Neal, Kemp Prather, S, Raleigh; Harvard, 1917 | 1920 | 1921 |
| Noble, Robert Primrose (Hon.), R, Raleigh; Univ. of N. C., 1907 | 1907 | 1908 |
| Oliver, Adlai Stevenson, ObG, Raleigh; Jefferson, 1914 | 1914 | 1919 |
| Oliver, Richard S., ObG, Raleigh; Jefferson, 1942 | 1942 | 1944 |
| Owen, John Fletcher, NP, Raleigh; Jefferson, 1920 | 1920 | 1927 |
| Parsons, W. S., U, Mobile, Ala.; McGill Univ., 1917 | 1944 | 1944 |
| Paschal, George W., Jr., S, Raleigh; Jefferson, 1931 | 1931 | 1946 |
| Payne, E. Louise, ObG, Raleigh; Woman's Coll. of Pa., 1942 | 1942 | 1945 |
| Powers, Frank Poydras, ALR, Raleigh; Univ. of Pa., 1927 | 1927 | 1928 |
| Procter, Ivan Marriott (Hon.), ObG, Raleigh; Univ. of Pa., 1915 | 1915 | 1917 |
| Reynolds, Carl Vernon (Hon.), PH, Raleigh; Univ. of N. Y., 1895 | 1895 | 1896 |
| Rhodes, John Sloan, U, Raleigh; Harvard, 1929 | 1929 | 1936 |
| Root, Aldert Smedes (Hon.), Pd, Raleigh; Univ. of Pa., 1911 | 1911 | 1913 |
| Royster, Chauncey Lake, GP, Raleigh; Cornell, 1935 | 1935 | 1941 |
| Royster, Hubert Ashley (Hon.), S, Raleigh; Univ. of Pa., 1894 | 1894 | 1895 |
| Ruark, Robert James, ObG, Raleigh; Univ. of Pa., 1931 | 1931 | 1934 |
| Sanders, L. H., Pd, Raleigh; Temple, 1942 | 1942 | 1946 |
| Sinclair, Lewis Gordon, S, Raleigh; Univ. of Pa., 1933 | 1933 | 1939 |
| Smith, Sidney S., Jr., U, Raleigh; Tulane, 1925 | 1925 | 1930 |
| Stainback, William C., S&ObG, Camp Lejeune; Univ. of Pa., 1941 | 1941 | 1947 |

Deceased.

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Stevick, Charles Paul, PH, Raleigh; Duke, 1936 | 1938 | 1940 |
| Styron, Charles W., I, Raleigh; Duke | 1946 | 1946 |
| Swisher, Otto J., Jr., PH, Raleigh; Ohio State Univ., 1927 | 1946 | 1946 |
| Thomas, B. D., GP, Zebulon; Med. Coll. of S. C., 1944 | 1946 | 1947 |
| Thompson, Hugh Alexander (Hon.), Or, Raleigh; Univ. of Pa., 1914 | 1914 | 1917 |
| Thompson, William Nelson, Hosp. Res., Raleigh; Boston Univ., 1939 | 1940 | 1940 |
| Thornhill, Edwin Hale, Raleigh; Duke, 1938 | 1941 | 1942 |
| Turner, Henry Gray (Hon.), S, Raleigh; Univ. of Pa., 1906 | 1907 | 1910 |
| Umphlet, Thomas Leonard, I, Raleigh; Univ. of Pa., 1934 | 1934 | 1939 |
| Wall, Roger Irving, OALR, Raleigh; Tulane, 1934 | 1934 | 1937 |
| Ward, Wallace Clyde, GP, Raleigh; Univ. of Louisville, 1931 | 1931 | 1934 |
| Ward, William Titus, GP, Raleigh; Univ. of Md., 1925 | 1925 | 1927 |
| Weathers, Rupert Ryan, GP, Knightdale; Med. Coll. of Va., 1926 | 1926 | 1928 |
| Webb, Alexander, Jr., S, Raleigh; Harvard, 1937 | 1940 | 1941 |
| Wells, Warner L., S, Raleigh; Duke, 1938 | 1941 | 1946 |
| West, Louis Nelson (Hon.), OALR, Raleigh; Jefferson, 1912 | 1912 | 1915 |
| Whitaker, D. N., GP, Raleigh; Temple, 1940 | 1940 | 1946 |
| Wilkerson, Annie Louise, ObG, Raleigh; Med. Coll. of Va., 1938 | 1938 | 1939 |
| Wilkinson, James S., D, Wake Forest; Univ. of Pa., 1938 | 1938 | 1940 |
| Wilkinson, Robert Watson, Jr., GP, Wake Forest; Tulane, 1922 | 1923 | 1924 |
| Williams, Charles Frederick, Pd, Raleigh; Jefferson, 1934 | 1934 | 1937 |
| Williams, Robert, R, Raleigh; Univ. of Pa., 1935 | 1935 | 1946 |
| Wilson, Thomas Barnette, Path, Raleigh; N. Y. Med. Coll., 1936 | 1946 | 1946 |
| Wilson, W. Howard, I, Raleigh; Jefferson, 1937 | 1937 | 1946 |
| Withers, William A., I, Raleigh; Rush Med. Coll., 1936 | 1937 | 1946 |
| Wooten, Jane Herring, Raleigh; Duke, 1942 | 1944 | 1946 |
| Wright, James Rhodes, OALR, Raleigh; Univ. of Md., 1940 | 1940 | 1940 |
| Wright, John Bryan (Hon.), OALR, Raleigh; Univ. Coll. of Med., Richmond, 1899 | 1899 | 1900 |
| Yarborough, Frank Ray, ALR, Cary; Univ. of Pa., 1923 | 1925 | 1926 |
| Young, David A., P, Raleigh; Harvard, 1931 | 1931 | 1946 |

## WARREN COUNTY SOCIETY[75]

| | | |
|---|---|---|
| **President:** Macon, Gideon Hunt, GP, Warrenton; Univ. Coll. of Med., Richmond, 1910 | 1910 | 1911 |
| **Secretary:** Foster, Howitt H., GP, Norlina; Jefferson, 1919 | 1919 | 1923 |
| Holt, Thomas Jefferson (Hon.), OALR, Warrenton; Med. Coll. of Va., 1904 | 1904 | 1911 |
| Hunter, Frank Patterson, GP, Warrenton; Univ. of Va., 1925 | 1925 | 1927 |
| Peete, Charles Henry (Hon.), Ob, Warrenton; Univ. of Pa., 1903 | 1906 | 1906 |
| Rodgers, William Daniel, GP, Warrenton; Jefferson, 1913 | 1913 | 1915 |

## WASHINGTON—SEE MARTIN-WASHINGTON-TYRRELL

## WAYNE COUNTY SOCIETY[76]

| | | |
|---|---|---|
| **President:** Rose, James William, GP, Pikeville; Tulane, 1928 | 1928 | 1931 |
| **Secretary:** Woodard, Albert G. (Hon.), Oph, Goldsboro; Univ. of N. C., 1907 | 1907 | 1909 |
| Benton, George Ruffin, Sr. (Hon.), Fremont; Med. Coll. of Va., 1901 | 1905 | 1904 |
| Benton, George Ruffin, Jr., Goldsboro; Univ. of Pa., 1934 | 1935 | 1938 |
| Best, Deleon Edward, C, Goldsboro; Univ. of Md., 1924 | 1924 | 1926 |
| Bizzell, James W., OALR, Goldsboro; Univ. of Md., 1943 | 1943 | 1947 |
| Bizzell, Marcus Edward, OALR, Goldsboro; Tulane, 1923 | 1923 | 1925 |
| Bizzell, Thomas Malcolm (Hon.), GP, Goldsboro; Univ. of Md., 1908 | 1908 | 1912 |
| Clark, Milton Stephen, I&A, Goldsboro; Emory, 1937 | 1937 | 1939 |
| Cobb, Donnell Borden, S, Goldsboro; Univ. of Pa., 1921 | 1921 | 1926 |
| Crawford, William Jennings, U, Goldsboro; Med. Coll. of Va., 1922 | 1922 | 1923 |
| Crumpler, Warren H., GP, Mt. Olive; Bowman Gray Sch. of Med., 1943 | 1943 | 1947 |
| Dale, Grover Cleveland, GP, Goldsboro; Univ. of Pa., 1925 | 1925 | 1927 |
| Dowling, Judson Davie, Jr., GP, Mt. Olive; George Washington Univ., 1940 | 1941 | 1942 |
| Etherington, John L., OALR, Goldsboro; Queen's Univ., Kingston, Canada | 1946 | 1947 |
| Harrell, Leon Jackson, Goldsboro; Univ. of Md., 1930 | 1930 | 1934 |
| Henderson, Clair Crouse, GP, Mt. Olive; Univ. of Md., 1914 | 1914 | 1919 |
| Hollowell, Claude Velmont, Goldsboro; Med. Coll. of Va., 1928 | 1928 | 1932 |
| Howard, Corbett Etheridge, R, Goldsboro; Univ. of Pa., 1925 | 1925 | 1927 |
| Irwin, Henderson (Hon.), GP, Eureka; Univ. of Md., 1912 | 1914 | 1916 |
| Ivey, Henry B. (Hon.), R, Goldsboro; Univ. Coll. of Med., Richmond, 1911 | 1911 | 1917 |
| Long, Ira Clinton, PN, Goldsboro; Univ. of Md., 1923 | 1923 | 1937 |
| McCuiston, Allen Masten (Hon.), Pr, Mt. Olive; N. C. Med. Coll., 1911 | 1911 | 1917 |
| McPheeters, Samuel Brown, PH, Goldsboro; Washington Univ., 1906 | 1933 | 1934 |
| Miller, Robert Bascom (Hon.), Pd, Goldsboro; Med. Coll. of Va., 1898 | 1900 | 1902 |
| Pate, Archibald Hanes, Goldsboro; Duke, 1937 | 1939 | 1941 |
| Peele, James Clarendon, Goldsboro; Temple, 1936 | 1937 | 1942 |

| *Name and Address* | *Licensed* | *Joined State Society* |
|---|---|---|
| Powell, E. Charles, Jr., Goldsboro; Univ. of Pa., 1935 | 1935 | 1937 |
| Rose, David Jennings, S, Goldsboro; Tulane, 1922 | 1922 | 1924 |
| Smith, William Carey, GP, Goldsboro; Univ. of Md., 1936 | 1936 | 1938 |
| Strosnider, Charles Franklin (Hon.), I, Goldsboro; Univ. of Md., 1909 | 1910 | 1913 |
| Tart, Baston Isaiah, Jr., Goldsboro; Temple, 1938 | 1938 | 1942 |
| Thompson, Winfield L., S&G, Goldsboro; Univ. of Md., 1938 | 1938 | 1946 |
| Trachtenberg, William, GP, Goldsboro; Duke, 1939 | 1946 | 1947 |
| Warrick, Luby Albert, GP, Goldsboro; George Washington Univ., 1923 | 1923 | 1924 |
| Whelpley, Frank Livingston, P, Goldsboro; Univ. of Mo., 1902 | 1918 | 1919 |
| Wolfe, Harold E., D&R, Goldsboro; Med. Coll. of Va., 1943 | 1946 | 1946 |
| Zealy, Albert Hazel, Jr., GP, Goldsboro; Harvard, 1930 | 1932 | 1934 |

## WILKES-ALLEGHANY COUNTIES SOCIETY[77]

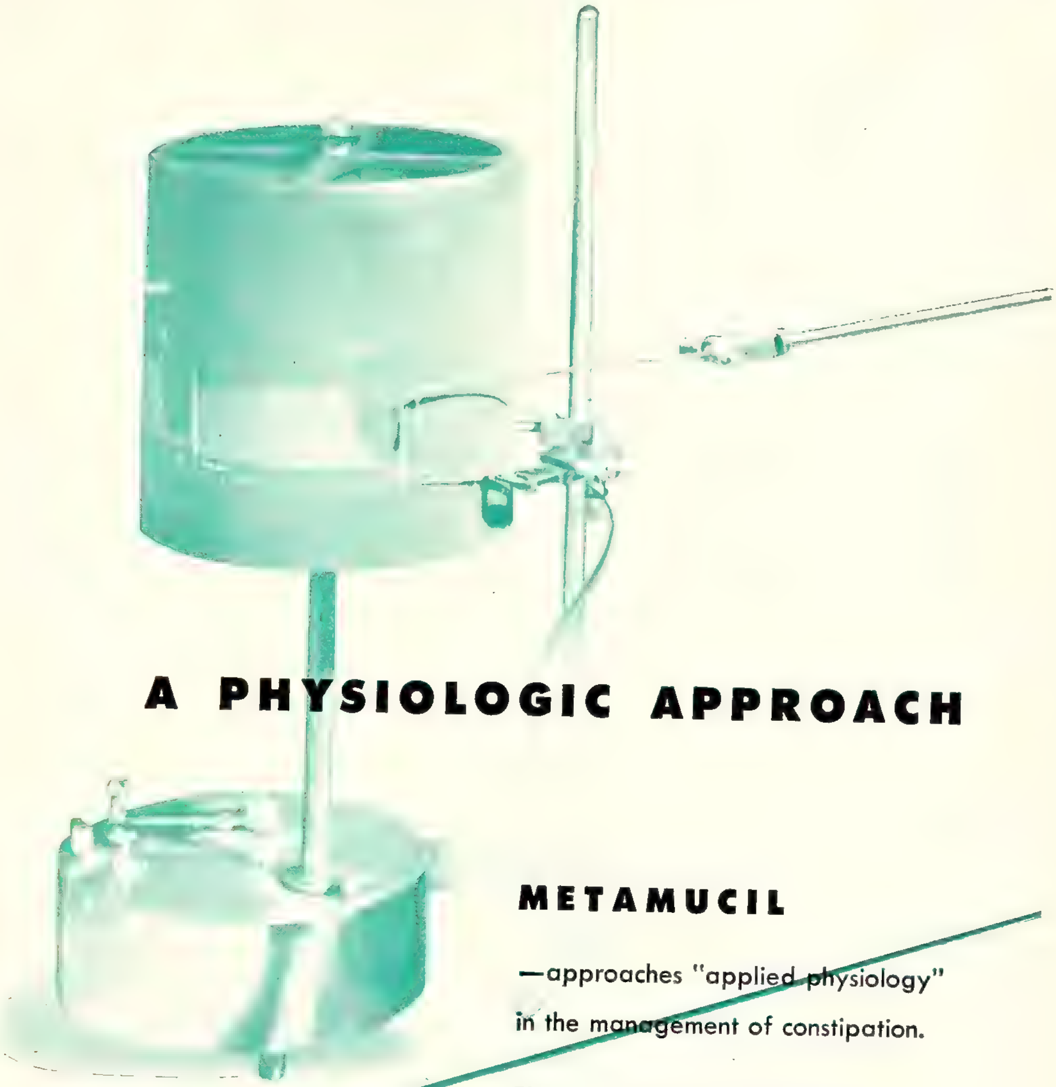
| | | |
|---|---|---|
| **President:** Phillips, Ernest Nicholas, GP, North Wilkesboro; Med. Coll. of Va., 1930 | 1930 | 1935 |
| **Secretary:** Bundy, William Lumsden, North Wilkesboro; Vanderbilt, 1936 | 1936 | 1940 |
| Bentley, James Gordon, GP, Moravian Falls; Univ. of Louisville, 1911 | 1938 | 1939 |
| Bumgarner, John Reid, North Wilkesboro; Med. Coll. of Va., 1939 | 1939 | 1940 |
| Eller, Albert J. (Hon.), PH, Wilkesboro; Coll. of P. & S., Baltimore, 1893 | 1895 | 1904 |
| Gilreath, Frank Hackett (Hon.), Wilkesboro; Univ. of Nashville, 1898 | 1898 | 1898 |
| Hubbard, Frederic Cecil, S, North Wilkesboro; Jefferson, 1918 | 1919 | 1924 |
| Lewis, Robert Edward, S, North Wilkesboro; Jefferson, 1944 | 1944 | 1946 |
| McNeill, James Hubert, I, North Wilkesboro; George Washington Univ., 1926 | 1926 | 1927 |
| Miles, Walter W., GP, Purlear; Univ. of Tenn., 1931 | 1933 | 1934 |
| Mills, James C., North Wilkesboro; Tulane, 1942 | 1946 | 1946 |
| Mitchell, Gurney Talmage, GP, Wilkesboro; Jefferson, 1927 | 1927 | 1928 |
| Newton, William King, OALR, North Wilkesboro; Med. Coll. of Va., 1931 | 1932 | 1933 |
| Sink, Charles Shelton (Hon.), GP, North Wilkesboro; N. C. Med. Coll., 1912 | 1912 | 1913 |
| Smith, Harold Benjamin, G, North Wilkesboro; Med. Coll. of S. C., 1929 | 1929 | 1930 |
| Thompson, Clive Allen, GP, Sparta; Med. Coll. of Va., 1924 | 1924 | 1936 |
| Triplett, William Romulus, GP, Purlear; N. C. Med. Coll., 1914 | 1915 | 1920 |

## WILSON COUNTY SOCIETY[78]

| | | |
|---|---|---|
| **President:** Herring, Tilghman, Wilson; Johns Hopkins, 1938 | 1938 | 1941 |
| **Secretary:** McLain, John Edward Gorsuch, T, Wilson; George Washington Univ., 1929 | 1941 | 1942 |
| Bardin, Robert Malcolm, GP, Wilson; Tulane, 1929 | 1934 | 1935 |
| Bell, George Erick, ObG, Wilson; Jefferson, 1921 | 1921 | 1922 |
| Best, Henry Blount (Hon.), GP, Wilson; Univ. of N. C., 1907 | 1907 | 1908 |
| Blackshear, Thomas Joseph, OALR, Wilson; Emory, 1914 | 1923 | 1924 |
| Bradshaw, Thomas Gavin, GP, Wilson; Med. Coll. of Va., 1909 | 1924 | 1924 |
| Clark, Badie Travis, S, Wilson; Univ. of Ga., 1930 | 1934 | 1935 |
| Dickinson, Elijah Thomas (Hon.), ALR, Wilson; Med. Coll. of Va., 1895 | 1895 | 1900 |
| Eagles, Charles Sidney (Hon.), GP, Saratoga; Univ. of N. C., 1909 | 1909 | 1910 |
| Easom, Herman Franklin, T, Wilson; George Washington Univ., 1927 | 1927 | 1929 |
| Fike, Ralph Llewellyn, GP, Wilson; Med. Coll. of S. C., 1932 | 1933 | 1934 |
| Goodwin, Cleon Walton, S, Wilson; Univ. of Pa., 1934 | 1934 | 1940 |
| Holmes, F. H., GP, Stantonsburg; Emory, 1942 | 1946 | 1947 |
| Hunter, William Cooper, I, Wilson; Univ. of Pa., 1928 | 1928 | 1931 |
| Kerr, Joseph T., S, Wilson; Jefferson Med. Coll., 1935 | 1935 | 1940 |
| McClees, Edward Chadwick, GP, Elm City; Med. Coll. of Va., 1917 | 1920 | 1920 |
| Meadows, J. H., OALR, Wilson; Med. Coll. of Va., 1934 | 1934 | 1947 |
| Mitchell, George William (Hon.), GP, Wilson; Univ. Coll. of Med., Richmond, 1913 | 1913 | 1914 |
| Pittman, Malory Alfred, Or, Wilson; Jefferson, 1921 | 1924 | 1927 |
| Putney, Robert Hubbard, GP, Elm City; Med. Coll. of Va., 1914 | 1914 | 1920 |
| Putney, Robert Hubbard, Jr., GP, Elm City; Med. Coll. of Va., 1943 | 1943 | 1946 |
| Simons, Claude Ernest, I, Wilson; Med. Coll. of Va., 1930 | 1930 | 1935 |
| Smith, Anderson Jones, GP, Black Creek; Univ. of Pa., 1921 | 1921 | 1923 |
| Stevens, Hamilton Wright, Jr., PH, Graham; Jefferson, 1938 | 1938 | 1940 |
| Strickland, Arthur Thomas, Ob, Wilson; George Washington Univ., 1932 | 1932 | 1935 |
| Strickland, Ernest Lee (Hon.), Pd, Wilson; Med. Coll. of Va., 1916 | 1916 | 1917 |
| Tashiro, Sabro, T, Wilson; Univ. of Cincinnati, 1937 | 1945 | 1946 |
| Tillery, Jack Gregory, GP, Wilson; Med. Coll. of Va., 1938 | 1938 | 1941 |
| Williams, Albert Franklin (Hon.), GP, Wilson; Univ. of Md., 1901 | 1901 | 1904 |
| Willis, Harry Clay, OALR, Wilson; Coll. of P. & S., Memphis, 1911 | 1916 | 1924 |
| Woodard, Charles Augustus (Hon.), S, Wilson; Univ. of Va., 1904 | 1904 | 1909 |
| Wright, J. T., GP, Bailey; Jefferson, 1943 | 1943 | 1947 |

## YADKIN—SEE SURRY-YADKIN

## YANCEY—SEE MITCHELL-YANCEY



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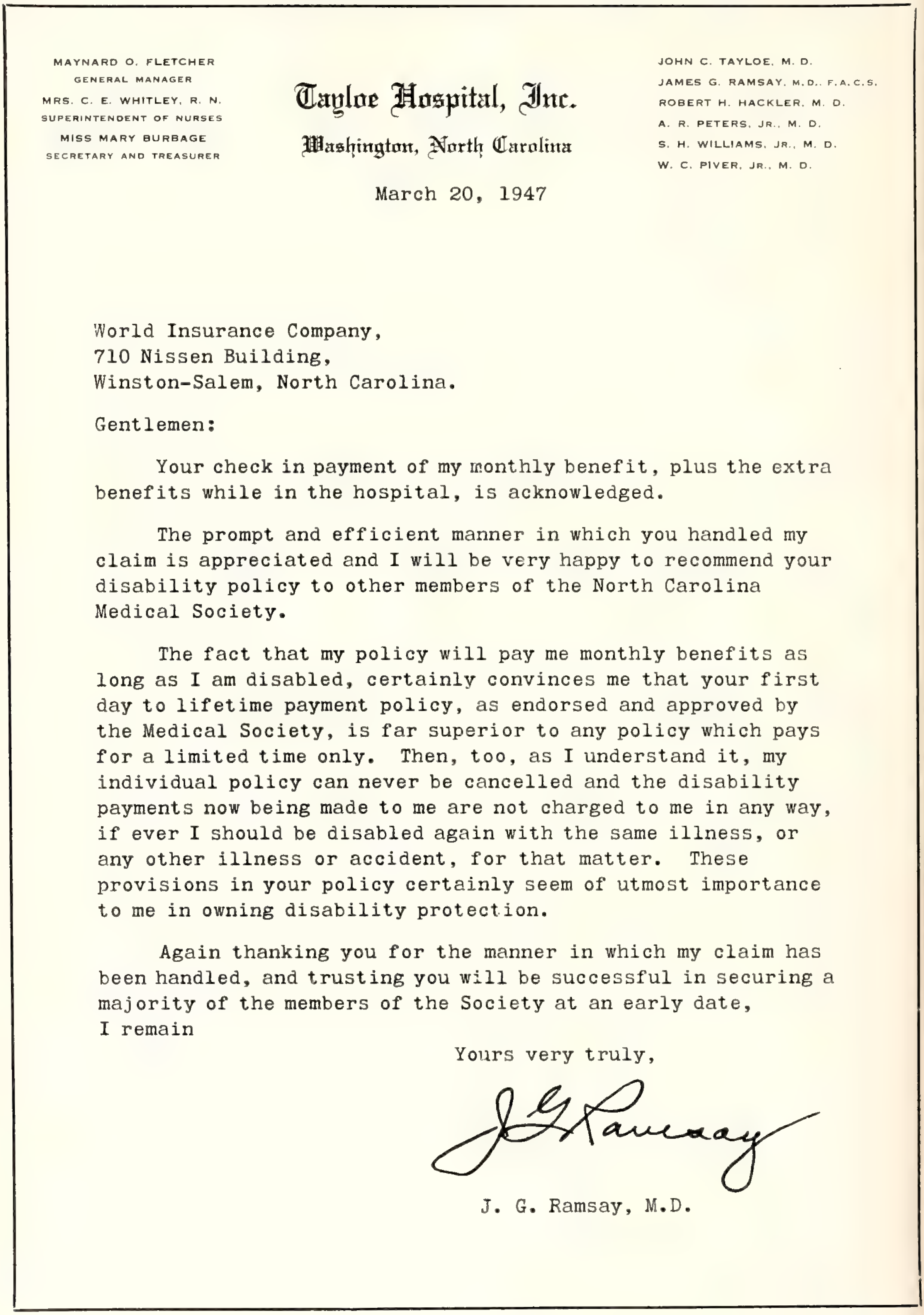

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March 20, 1947

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Again thanking you for the manner in which my claim has been handled, and trusting you will be successful in securing a majority of the members of the Society at an early date, I remain

Yours very truly,

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J. G. Ramsay, M.D.

NORTH CAROLINA MEDICAL JOURNAL

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VOLUME 8 SEPTEMBER, 1947 NUMBER 9

# DISTURBANCES OF THE CIRCULATION IN ACUTE INFECTIONS

GEORGE T. HARRELL, M.D.

WINSTON-SALEM

Why do people die with infections? Hippocrates noted a weak pulse with fever, and Laennec, soon after he had invented the stethoscope, observed that the heart sounds were faint in patients dying with infections. These early observations on the effects of infection on the circulation led to pathologic studies of the circulatory system. Myocardial damage had been recognized clinically as the cause of sudden death occurring during convalescence from diphtheria; the myocardial lesions produced by the exotoxin can be demonstrated pathologically. Circulatory failure which appears to be peripheral in type can be reproduced in animals by the injection of filtrates of bacterial cultures, but it is difficult to prove its existence by pathologic techniques. The occurrence of functional circulatory damage without an anatomic counterpart has been recognized in burns as well as in infections.

## *Peripheral and Central Failure*

### *Detection and differentiation*

It is extremely important that peripheral circulatory failure be differentiated from central (myocardial) circulatory failure. The therapy of these two conditions is diametrically opposed, and treatment for one will be harmful if the patient has the other. Circulatory failure can be detected and the type of failure determined by clinical observation, without elaborate and complicated studies. Careful observation of the blood pressure, pulse and respirations, of the degree of engorgement of the veins, of the extent of cyanosis, and of the presence or absence of edema is usually all that is necessary to confirm a suspicion of circulatory failure and to diagnose the type. In pure *peripheral circulatory failure* the systolic blood pressure is low, the pulse pressure small, and the pulse rapid and weak. The veins are not engorged; the lungs are clear, and the liver is not enlarged. In pure *central failure* the systolic blood pressure is normal or elevated and the pulse less rapid and weak. If the failure is right-sided, the veins will be engorged, the liver will be palpable, and dependent edema will be present; if the failure is left-sided, the lungs will contain rales. These observations can be made with the five senses and the equipment usually carried in a physician's bag.

### *Mechanism*

The explanation of the mechanism of failure requires detailed laboratory data; if laboratory studies can be performed, therapy can be much better controlled.

The mechanism by which *peripheral failure* develops illustrates several important principles. The extravascular circulation of fluid has been recognized for many years. The arterial pressure forces out crystalloids on the arteriolar side of the capillary bed; the fluid moves through tissue spaces, and is reabsorbed on the venous side of the capillary bed through the osmotic attraction of

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Read before the Section on the Practice of Medicine, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

From the Department of Internal Medicine, Bowman Gray School of Medicine of Wake Forest College and the North Carolina Baptist Hospital, Winston-Salem, North Carolina.

Fundamental studies on which part of this paper is based were aided by a grant from the John and Mary R. Markle Foundation.

the intravascular proteins. If capillary permeability is altered and blood proteins also leak out into the tissues, they will hold water and extravascular crystalloids in the interstitial spaces, and the amount of fluid remaining in the vascular tree will be reduced(1). The *circulating blood volume* and the amount of *extravascular fluid,* as well as the serum proteins and chlorides, are therefore of great importance.

*Central failure* may follow destruction of myocardial fibers through direct invasion by the etiologic agent, or through necrosis from its soluble toxins(2). Destructive or proliferative lesions may interfere with the function of conduction fibers. Vascular lesions produce myocardial damage as a result of the anoxia which follows the diminution of the blood supply to the myocardium.

Unfortunately, a single patient may have both peripheral and central failure successively or simultaneously. The correction of circulatory failure, therefore, poses tremendous problems in the proper selection of therapy.

### *Relation to the Course of Disease*

Circulatory changes occur at various times in the course of different infectious diseases. In some diseases circulatory changes occur over a period of days or weeks; Rocky Mountain spotted fever is an example. In other diseases the changes occur in the course of hours or days, as in pneumococcal lobar pneumonia. In some diseases the changes are hyperacute and occur within a period of minutes or hours; meningococcemia is an illustration. The changes should be anticipated on the basis of the natural history and usual course of the disease, and should be prevented if possible. The development of potent chemotherapeutic agents permits attack on the etiologic agent at the same time that the circulation is supported; these measures allow the patient time to develop immunity and to recover from his disease.

Circulatory disturbances reflect alterations in the distribution of fluids in the body. Metabolic as well as circulatory changes may occur; the alterations in the two systems are interrelated through the disturbances in proteins, electrolytes, and water.

### *Rickettsial Spotted Fever*

In rickettsial (Rocky Mountain) spotted fever the circulatory changes usually occur gradually over a period of days, and are most pronounced in the second week of the disease. The familiar diagnostic rash is produced by hemorrhage from the arteriolar side of the capillary bed. A vascular lesion can be easily demonstrated, but the physiologic disturbance is out of proportion to the number of anatomic lesions. As the disease progresses, the blood nonprotein nitrogen tends to rise and the chlorides to drop; the circulation may begin to fail as the result of dehydration and the chemical changes. The administration of crystalloids—glucose, saline, and water—will overcome the dehydration present in the first week of the disease and tend to correct the early circulatory changes, which are not accompanied by marked alterations in the plasma volume or extravascular fluid.

As the disease continues, the picture of peripheral circulatory collapse — "medical shock"—may develop later; at this time the circulating blood proteins are reduced. The administration of preformed protein in the form of plasma, blood or albumin is necessary to correct the circulatory collapse. At this stage the administration of crystalloids alone may wash out additional protein from the circulation, and increase the degree of peripheral circulatory collapse. Between the tenth and fourteenth days of rash circulatory changes are usually at a maximum. At this time the circulating plasma volume tends to drop, and extravascular fluid, as measured by the thiocyanate technique, increases(3). The absence of gallop rhythm, venous engorgement, and electrocardiographic changes at this time would indicate that the changes are predominantly peripheral in type.

If excessive crystalloids are given at any stage, either parenterally or orally through an indwelling nasal tube, the degree of edema may be markedly increased. We have seen instances of respiratory arrest and death which resembled cases of bulbar poliomyelitis; since the extravascular fluid has been markedly increased in these cases, we have interpreted the fatal outcome as being due to edema of the medulla. In other cases the ex-

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1. Harrell, G. T., Wolff, W. A., and Venning, W.: A New Approach to Basic Supportive Therapy in Rocky Mountain Spotted Fever, South. M. J. 38:367-371 (June) 1945.
2. Harrell, G. T.: Infectious Diseases of the Heart, North Carolina M. J. 4:95-97 (March) 1943.
3. Harrell, G. T., Aikawa, J. K., and Kelsey, W. M.: Rocky Mountain Spotted Fever, Am. Practitioner 1:425-435 (April) 1947.

cessive rehydration with crystalloids alone has led to tremors or convulsions which also are manifestations of cerebral edema. The neurologic signs suggest that the inter*cellular* fluid as well as the inter*stitial* fluid is increased in amount, though no satisfactory technique is available at present for measuring the hydration of cells.

The unnecessary administration of plasma to patients without marked alteration in the capillary permeability may precipitate central (myocardial) circulatory failure. We have seen instances where too vigorous supportive therapy has overloaded the circulation, increased the circulating blood volume, dilated the heart, and produced venous engorgement, gallop rhythm, and pulmonary edema. The administration of digitalis and a reduction in the amount of preformed protein and other fluids given will usually correct these changes.

The proper use of large amounts of fluid can be illustrated by our experience with a 2-year-old child, weighing approximately 12 Kg. (26 pounds)(4). During the first week, the pulse was disproportionately high and feeble. Gallop cardiac rhythm was noted, but no peripheral venous engorgement was present and the lungs were clear. The failing peripheral circulation necessitated the administration of protein, and the low blood chlorides and high nonprotein nitrogen, the administration of crystalloids. She received 2800 cc. of blood and plasma intravenously during the course of her illness; this amount represents almost complete replacement of the circulating blood volume. In addition, she received parenterally 2400 cc. of other fluids after an adequate intravascular osmotic attraction was assured. The careful selection of the type and quantity of fluid, as well as the route of administration, made possible successful therapy of the dehydration and peripheral collapse without the precipitation of congestive failure. The patient recovered.

The administration of hyperimmune rabbit antiserum or para-aminobenzoic acid (PABA), along with adequate supportive therapy, has not prevented the development of circulatory changes in Rocky Mountain spotted fever. We have seen marked increase in capillary permeability, with both peripheral and central circulatory failure, in patients treated within the first three days of rash with both serum and PABA; the alterations in the blood volume and extravascular fluid space reverted with recovery and the development of immunity. The occurrence of the most severe changes at the time when immunity is attaining ascendancy over the infection suggests that the immune reaction is involved in the alteration of permeability of the cell membranes.

### *Pneumococcus Pneumonia*

In pneumococcus lobar pneumonia the changes in the circulation occur in the course of days. The loss of chlorides from the circulating blood and the development of alkalosis have been recognized for years. Recently an increase in the extravascular thiocyanate space has been demonstrated in the course of pneumococcal pneumonia(5). How much of the chloride loss represents leakage into edematous tissue spaces is not yet known. The finding that the circulating blood volume is also increased makes possible a logical explanation of the mechanism by which the right side of the heart tends to fail during pneumonia, particularly following the excessive administration of intravenous fluids. The usual increase in blood volume is exaggerated by the additional fluid, and the myocardium is overloaded; the beneficial effects of digitalis in some cases of pneumonia are probably due to the correction of the central (myocardial) circulatory failure.

The additional factor of anoxia in circulatory failure can be more clearly illustrated in pneumococcal pneumonia than in some other diseases. The presence of the pulmonary lesion decreases the size of the vascular bed available for oxygenation of the blood, and cyanosis develops. The anoxia can be alleviated by the administration of an increased tension of oxygen in a tent, through a face mask, or by other techniques.

### *Meningococcemia*

Meningococcemia is a hyperacute infection in which the circulatory changes develop in a period of hours. An anatomic vascular lesion is present, as is shown by the hemor-

4. Harrell, G. T., Venning, W., and Wolff, W. A.: The Treatment of Rocky Mountain Spotted Fever with Particular Reference to Intravenous Fluids, J.A.M.A. 126:929-931 (Dec. 9) 1944.

5. Rutstein, D. D., et al.: Plasma Volume and "Extravascular Thiocyanate Space" in Pneumococcus Pneumonia, J. Clin. Investigation 24:11-20 (Jan.) 1945.

rhagic rash in the skin. Peripheral vascular collapse may develop with extreme rapidity, requiring vigorous support of the circulation. The collapse occurs too rapidly for visible edema to develop. The availability of specific chemotherapeutic agents—sulfadiazine and penicillin—makes possible immediate attack on the etiologic agent in an attempt to prevent further vascular damage.

We have studied intensively a 17-year-old girl who was known to have had Banti's syndrome for at least a year before meningococcemia occurred. She was admitted to the hospital with peripheral circulatory collapse, but responded to simple measures which corrected dehydration and replaced the circulating blood volume. After the acute symptoms of infection had been controlled with chemotherapy, subcutaneous pitting edema developed and the plasma proteins were found to be low; plasma was then administered to correct the hypoproteinemia. This therapeutic measure apparently increased the circulating blood volume to such an extent that an esophageal varix ruptured and the patient went into hemorrhagic shock. She was treated conservatively, but after the bleeding stopped, whole blood was given to replenish that lost from the circulation. Again the circulating blood volume was increased, but this time central circulatory failure developed, producing gallop rhythm, venous engorgement, and rales in the lungs. The cardiac failure was probably due to overloading of a heart which had been damaged by acute infection; meningococcemia is known to cause myocardial necrosis and fibrosis which can often be demonstrated pathologically. The patient subsequently had a pulmonary infarction which further aggravated the myocardial failure; she was treated with digitalis and venesection without success. This girl thus presented the unusual picture of three different types of circulatory failure occurring successively — peripheral circulatory collapse due to the toxicity of the infection, hemorrhagic shock, and cardiac failure due to infectious myocardial damage.

We have also studied a case of meningococcemia in a middle-aged shoemaker who came in with peripheral circulatory failure so severe that it had produced collapse of the neck and arm veins(6). Because of the severity of the vascular collapse and the presence of deep cyanosis and coma, bilateral adrenal hemorrhage was suspected; clinical evidence of this lesion—the Waterhouse-Friderichsen syndrome—had not been present in the girl with meningococcemia. The correction of dehydration with saline resulted in no clinical improvement. Large amounts of plasma were administered intravenously, but the blood pressure did not rise. The failure of these initial therapeutic measures tended to confirm the clinical impression of adrenal cortical failure. Accordingly, adrenal cortical hormone in an aqueous solution containing 50 dog units per cubic centimeter was given intravenously. A dramatic change in the patient's clinical condition occurred following the administration of the first 150 of the total dose of 500 units. The blood pressure rose, the veins filled, the coma disappeared, and the patient roused. Some hours later a gallop rhythm and distention of the veins of the neck rapidly appeared, indicating acute myocardial failure; the intravenous administration of strophanthin-K was started, but the patient died before digitalization was completed.

Autopsies were performed on both patients. The adrenals in the girl showed no evidence of hemorrhage; both adrenals in the man were completely destroyed by fresh hemorrhage. It is evident that in these instances peripheral vascular collapse due to infection alone and that due to adrenal cortical destruction were differentiated clinically.

### *Therapy*

The physician should be prepared to estimate accurately the degree and type of circulatory change. If possible, changes should be anticipated and prevented. In infections which run a relatively long course, a high-protein diet containing 3 to 6 Gm. of protein per kilogram of body weight should be administered from the onset; if the patient cannot eat, a diet containing this amount of protein may be conveniently given in concentrated liquid form and, if necessary, by gavage tube(7). In the rickettsial diseases and

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6. Harrell, G. T.: Discussion in Clinicopathologic Conference, North Carolina M. J. 7:562-565 (Oct.) 1946.

7. Harrell, G. T., Wolff, W. A., Venning, W. L., and Reinhart, J. B.: The Prevention and Control of Disturbances of Protein Metabolism in Rocky Mountain Spotted Fever: the Value of Forced Feedings of a High-Protein Diet and of the Administration of Specific Antiserum, South. M. J. 39:551-558 (July) 1946.

many other infections, time permits the practical use of dietary therapy to maintain the circulating blood proteins and to prevent peripheral failure or reduce its severity. In acute peripheral circulatory collapse, preformed protein must be administered in the form of concentrated serum albumin, plasma, or whole blood. Water, salt, and glucose should be used carefully at all times; if evidence of altered capillary permeability is present and the circulating blood proteins are low, preformed proteins should also be given. Oxygen should be administered if evidence of circulatory failure of either type occurs. The requirement of oxygen should be anticipated before the need is evident clinically. Anoxia not only stops the machine; it wrecks the machinery, so that the administration of large amounts of oxygen will be ineffective if anoxia has been present for hours.

In hyperacute infections the possibility of adrenal cortical necrosis must be considered. If necrosis is suspected, specific cortical hormonal replacement therapy should be immediately instituted. The decision to use hormonal therapy must be based on clinical judgment alone, since there is not time for changes in the blood chemistry to develop. The hormone must be given in large amounts to be effective; the synthetic hormone, desoxycorticosterone acetate, is not as effective as the natural hormone obtained by extraction of fresh adrenal glands.

Myocardial damage can be detected by clinical means alone, but can be confirmed with an electrocardiogram. Digitalis should be administered if any evidence of cardiac failure occurs, but should not be given prophylactically in patients who are receiving large amounts of fluid. Digitalis decreases the efficiency of the compensated heart, and therefore is contraindicated unless signs of central failure have developed. Overloading of the circulation by the excessive administration of any fluid by any route tends to precipitate myocardial failure and may kill the patient. This danger is especially great if the myocardium is damaged by the infection or by previous disease.

The organism causing the circulatory changes should be attacked, if means are available. Depending on the etiologic agent, chemotherapy in the form of penicillin or other antibiotics, sulfonamides, or para-aminobenzoic acid should be administered in full doses as soon as the diagnosis is suspected. Chemotherapy will reduce the number of organisms available for the release of toxic products, but this reduction in number takes time. If suitable antibodies are available, the toxic effects may be neutralized quickly by the administration of antisera or antitoxins. Immune therapy should be combined with chemotherapy in severe infections, since the two supplement each other.

### *Summary*

Either peripheral vascular collapse or central (myocardial) circulatory failure may develop in the course of many infectious diseases. In some cases both types of failure occur simultaneously or successively. The type of circulatory failure can be differentiated at the bedside by clinical observation. Therapy must be carefully planned to support the failing peripheral circulation without overloading the heart, or to improve myocardial efficiency without increasing appreciably the circulating blood volume and work of the heart. Carefully planned supportive therapy will enable many patients to survive acute crises and will allow recovery by the development of immunity.

# THE PRESENT STATUS OF VAGOTOMY IN THE TREATMENT OF PEPTIC ULCER

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H. M. Taylor, M.D.
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*and*
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Vagotomy as a method of treating peptic ulcer is in an evaluation stage. Few patients have been followed more than four years since operation, and in most cases the period of follow-up has been less than two years. Nevertheless, the operation has been adopted by many surgeons and recommended by some internists. It seems advisable that current reports of those pioneering in the evaluation of the operation be reviewed and compared.

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Read before the Second General Session, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

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Four groups have participated in three symposia on the subject this spring. Their manuscripts will be reviewed, and an impartial presentation of their results and opinions will be attempted. Since data and conclusions are presented in various ways, it will be necessary to interpret them for purpose of comparison. The material in the following analysis and in the tables may vary, therefore, in some details from the original manuscripts quoted.

Vagotomy, usually through an abdominal approach and probably incomplete in most instances, has been tried without success by several surgeons for more than twenty years. In January, 1943, Dragstedt and his coworkers at the University of Chicago began to perform vagotomy through a transthoracic approach and later through a transabdominal approach. They evidently were the first to effect complete vagotomy consistently and to obtain good clinical results. Their last report(1) describes operations on 212 patients and gives details of the results obtained in the first 160 cases. Because of Dragstedt's early results, a study of transthoracic vagotomy was begun at Duke in June, 1944. The effects of the transabdominal approach combined with pyloroplasty, exclusion, or gastrojejunostomy are now being studied. Seventy-seven patients have been treated and a detailed report of the results in the first 57 cases has been published(2). At the Massachusetts General Hospital Moore and his coworkers have used transthoracic vagotomy in 80 patients since August, 1944, and have reported in detail the results in 74 cases(3). Walters and others at the Mayo Clinic have reported a more recent series in which the transabdominal approach was the usual procedure; early results in 83 patients are described(4). For convenience the four groups of workers mentioned above will hereafter be referred to respectively by the terms U. of C., Duke, M. G. H., and Mayo. Recent reports of smaller series of cases will not be reviewed.

### *Results*

The types of operations performed and essential results are presented in table 1. The 362 patients included in this table had duodenal, stomal, or gastric ulcers with serious symptoms before vagotomy.

*Transthoracic vagotomy*

The operation most frequently employed was transthoracic vagotomy without gastroenterostomy (table 1, group A). Among the 203 patients in this group there were three deaths during the immediate postoperative period, and 4 cases in which persistence of ulcer required a secondary operation. One patient in the U. of C. series had a secondary removal of an overlooked vagus fiber. In 2 patients of the Duke group secondary subtotal gastrectomy was performed—in one for persistent duodenal ulcer, in the other for persistent gastric ulcer. The M. G. H. patient, who had a stomal ulcer following resection with incomplete removal of the antrum and subsequent vagotomy, was treated by excision of the remainder of the antrum adjacent to the duodenum. In addition to these 4 patients requiring secondary operation there were 15 patients who, after transthoracic vagotomy, described symptoms similar to those before operation, but of less severity. These patients presumably have incompletely healed ulcers, and it is probable that some may later require secondary surgery.

Altogether a little more than half of the patients in this group (group A, table 1) have had temporary, intermittent, or moderately severe diarrhea. An additional 17 have diarrhea considered by the authors as serious, although ordinarily not disabling. One of our patients, however, died two years after vagotomy from an exacerbation of a preexisting gastrointestinal disturbance with diarrhea.

Symptoms of retention of food in the stomach, such as a sensation of fullness or eructa-

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1. Dragstedt, L. R., Harper, P. V., Jr., Tovee, E. B., and Woodward, E. R.: Section of the Vagus Nerves to the Stomach in the Treatment of Peptic Ulcer, read before the American Surgical Association, March, 1947; in press. Ann. Surg.
2. Grimson, K. S., Baylin, G. J., Taylor, H. M., Hesser, F. H., and Rundles, R. W.: The Effects of Transthoracic Vagotomy in 57 Patients with Peptic Ulcer—Clinical Limitations, J.A.M.A. 134:925-932 (July 12) 1947.
3. Moore, F. D.: (a) Vagus Resection for Ulcer: An Interim Evaluation, I. Operative Technique and Hospital Management, read before the Central Surgical Association, February, 1947; in press, Arch. Surg. (b) Vagus Resection for Ulcer: An Interim Evaluation, II. Clinical Results, read before American Surgical Association, March, 1947; in press, Ann. Surg.
4. Walters, W., Bradley, W. F., Small, J. T. and Wilson, J. W.: (a) Gastric Neurectomy: Anatomic and Physiologic Studies with Favorable and Unfavorable Results in the Treatment of Peptic Ulcer, read before the Central Surgical Association, February, 1947; in press, Arch. Surg.; (b) A Study of the Results, Both Favorable and Unfavorable, of Section of the Vagus Nerves in the Treatment of Peptic Ulcer, read before the American Surgical Association, March, 1947; in press, Ann. Surg.

Table 1

| | *No. Patients* | *Operative Deaths* | *Secondary Operation* | *Symptoms of Persistent Ulcer* | *Severe Diarrhea* | *Major Symptoms (Retention)* | *Good Results* |
|---|---|---|---|---|---|---|---|
| **A. Transthoracic Vagotomy Alone** | | | | | | | |
| U. of C. | 57 | 1 | 1 | 2 | 7 | 19 | 53 |
| Duke | 61 | 0 | 2 | 5 | 3 | 28 | 50 |
| M. G. H. | 72 | 1 | 1 | 6 | 5 | 9 | 62 |
| Mayo | 13 | 1 | 0 | 2 | 2 | 2 | 7 |
| **B. Transabdominal Vagotomy Alone** | | | | | | | |
| U. of C. | 33 | 0 | 1 | 1 | ? | 19 | 31 |
| Mayo | 22 | 1 | 1 | 2 | ? | 7 | 10 |
| **C. Vagotomy and Secondary Gastroenterostomy** | | | | | | | |
| U. of C. | 6 | 0 | 0 | 0 | 0 | 0 | 6 |
| Duke | 8 | 0 | 0 | 1 | 0 | 0 | 5 |
| M. G. H. | 2 | | | | | | |
| Mayo | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| **D. Vagotomy and Routine Gastroenterostomy** | | | | | | | |
| U. of C. | 64 | 0 | 0 | 0 | 0 | 8 | 64 |
| Duke | 8 | 1 | 0 | 0 | 1 | 0 | 7 |
| Mayo | 15 | 1 | 1 | 1 | 1 | 10 | 9 |
| TOTAL | 362 | 6 | 7 | 20 | 19 | 102 | 305 |

tion with a foul or rotten-egg odor, have been considered of major importance in 58 patients. They have occurred to a lesser degree in many others.

The results were considered satisfactory in 172, or 85 per cent of the 203 patients. In view of the severity of the disease in many of these patients before vagotomy and the fact that 32 had stomal ulcers after previous gastroenterostomy and at least 23 had stomal ulcers after subtotal gastrectomy, this percentage of satisfactory results might be considered favorable.

### *Transabdominal vagotomy*

Transabdominal vagotomy without gastroenterostomy (table 1, group B) has been used by two groups, U. of C. and Mayo, in a total of 55 patients. Although these patients have not been followed as long as those having transthoracic vagotomy alone, it would seem that results are similar. The abdominal approach permits exploration of the viscera and of the ulcer, and eliminates the possibility inherent in the use of the transthoracic procedure that the diagnosis might be in error, or that coexistent pathology might be missed. Dragstedt believes that by examining the duodenum he can judge whether or not a patient should have a gastroenterostomy.

### *Vagotomy followed by gastroenterostomy*

In addition to the total of 258 patients treated by vagotomy alone (table 1, groups A and B) there were 17 patients (table 1, group C) in whom this procedure was followed sooner or later by obstructive symptoms necessitating secondary gastroenterostomy. This incidence of cases requiring secondary gastroenterostomy in the combined group (6-7 per cent) is much lower than that in our Duke series, where 1 patient in 7 required secondary operation. Dragstedt and Moore believe that their lower incidence is a result of continuous gastric aspiration during the first five days after vagotomy and subsequent light or liquid feedings followed by nightly residual aspiration. They also believe that scar tissue has caused their obstructions. Our experience has been that careful postoperative management of the type described, plus the use of urecholine or other parasympathomimetic drugs, has not lessened the incidence of obstructive symptoms requiring secondary gastroenterostomy. We feel that, although obstruction may result partly from scar tissue in some patients, physiologic obstruction caused by removal of the vagal innervation to the outlet of the stomach is also important and may by itself cause serious retention. Four of our secondary gastroenterostomies were performed weeks or months after vagotomy because of serious retention symptoms and loss of weight. In our experience gastrojejunostomy has been less satisfactory after vagotomy than exclusion or pyloroplasty. Any surgically made stoma in these patients may function poorly for several weeks. Levine tubes are, therefore, placed through the anastomosis at the time of operation whenever possible.

### *Vagotomy with routine gastroenterostomy*

The high incidence of gastric retention and of obstructive symptoms necessitating secondary gastroenterostomy has led three of the groups to explore the effectiveness of a combination of vagotomy and routine gastroenterostomy (group D, table 1). A transabdominal approach best facilitates this combination. Dragstedt began combining subdiaphragmatic vagotomy and gastroenterostomy routinely for patients with duodenal ulcer in 1945, but now employs gastroenterostomy only in about one third of his patients. At present we combine transabdominal vagotomy with pyloroplasty or exclusion routinely in patients with duodenal ulcer. Walters usually combines the operations, but Moore opposes combination and uses the transthoracic approach alone.

### *Vagotomy for Gastric or Stomal Ulcer*

There is a difference of opinion about the use of vagotomy for gastric ulcer. Dragstedt employs transabdominal vagotomy routinely in these cases, and we elect transthoracic or transabdominal vagotomy, or gastric resection, depending upon the characteristics of the individual problem. Moore and Walters oppose vagotomy for gastric ulcers because the incidence of carcinoma in patients with the diagnosis of gastric ulcer is known to be 10 per cent or more. For patients with stomal ulcer all four groups prefer vagotomy, and report excellent results.

### *Variability of Effects of Vagotomy*

Each group reports that the effects of vagotomy are variable. Generally the volume of secretions of the fasting stomach is reduced by half or more, and the increase in free acid that normally follows insulin hypoglycemia is abolished. Dragstedt and Walters accept these two occurrences as proof of complete vagotomy. Our group and the M. G. H. authors feel that the results of the insulin hypoglycemia test are so variable in the same patient that it does not necessarily furnish an absolute indication of completeness of vagotomy. The insulin test may also be altered by subtotal gastrectomy without vagotomy.

All authors now agree that the increase in free acid following the injection of histamine is variable after vagotomy, but usually less so than before operation. All agree also that gastric motility is decreased, and some feel that the stomach is "atonic." Gastrometric studies by Hesser and Grimson indicate that, as forceful contractions decrease after vagotomy, resting contraction of the stomach increases slightly. This finding may represent increase rather than loss of "tone" during the resting stage between contractions. Effects of the operation on the motility of the stomach and on the delay of emptying vary from patient to patient and may vary during consecutive examinations of the same patient.

Dragstedt and Walters believe that all variations described above result from anomalous vagus fibers not removed during vagotomy. Such anomalous fibers were found in 10 per cent of dissections made on fresh autopsy material by Miller(5) and Walters. It is our belief that there are also other explanations. Taylor and Grimson observed that patients with obstruction and retention occasionally had high values for free acid, and that relief of the obstruction decreased the amount of free acid present in the stomach.

Many patients in the U. of C. series and the Duke series have been followed two to four years after vagotomy. These groups have each reported that the effects of vagotomy on acidity and motility usually persist. The M.G.H. series also includes patients followed longer than two years, but these authors report that the effects of vagotomy are temporary and that acidity and motility return to normal.

### *Theoretical Explanation of Diarrhea*

Although the cause of the diarrhea which follows vagotomy in some patients is not known, explanations have been offered. Dragstedt believes that the retention of gastric contents and the decrease or elimination of free acid in gastric secretions lead to growth of bacteria, fermentation of food, and elaboration of various irritating organic acids. He has used sulfasuxidine with success in some patients. We long ago observed a relationship between gastric retention and diarrhea, and recommendeed lavage of the stomach in patients with temporary or recurring serious episodes. Together with Moore, however, we have observed that diarrhea may occur in patients without gastric retention, and that there must be another unknown explanation for the diarrhea.

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(5) Miller, E. M., and Davis, C. B., Jr.: An Anatomic Study of the Vagus Nerves, J.A.M.A. 133:161-162 (Feb. 15) 1947.

### *Theoretical Explanation for Relief of Pain and Healing of Ulcer*

Dragstedt first proposed the thesis that relief of ulcer-like pain immediately after vagotomy and before healing could occur is to be explained largely by reduction in the acidity of the gastric contents. He reported that in 3 patients introduction of acid three days after vagotomy reproduced the original ulcer pain. Ruffin, Smith, and White have not confirmed this observation by studies on a larger series of patients. No author believes that pain pathways travel in the vagus and are thus divided by operation. We postulated cessation of forceful contractions of the stomach as a possible major explanation for the relief of pain, and this view is held by Walters. Although all authors accept both explanations and vary only in their impression of their relative importance, we now feel, as a result of further study, that there must be other explanations. One of these is a decrease in mechanical irritation of the ulcer. Forceful thrust of gastric content into the ulcer seldom if ever occurs after vagotomy. It is also possible that turgescence of blood vessels of the gastric mucosa occurring during emotional strain or ulcer pain may be altered by the vagotomy. A complete or adequate explanation for the relief of pain has not been developed. It is significant, however, that ulcer pain may return in patients with ulcers that fail to heal after vagotomy.

### *Terminology*

Usage has apparently established "vagotomy" as the common term for this operation. Dragstedt originally employed it. His operation divides the nerves and increases the distance between their ends by doubling one segment back on itself. We resect long segments of the nerves and of their branches, but employ the term "vagotomy" in a physiologic sense; resection is done only to forestall regeneration, and—in contrast to resection of the thyroid gland or the stomach—adds nothing to the physiologic effect. Moore recommends and employs the term "vagus resection." Walters introduced the term "gastric neurectomy." Three groups— U. of C., Duke, and Mayo—frequently use the term "vagus section."

### *Discussion*

It is not yet possible to compare vagotomy with subtotal gastric resection as a means of treating peptic ulcer. Additional clinical studies over a longer period of time will be necessary. It now seems probable, however, that both operations have their limitations, but that either can supplement the other. Evidently the incidence of persistence or recurrence of ulcer is low following either operation. Vagotomy apparently carries the advantages of lower operative mortality and of greater likelihood that patients will maintain or gain weight and strength. Vagotomy is also apparently more effective than resection for patients who present histories of recurring episodes of serious hemorrhage. Complications characteristic of vagotomy—fullness and malodorous eructation, diarrhea, and bowel cramps—occur frequently, but fortunately are only occasionally serious At this time it seems probable that, since the failure rate of both operations is low, it is not advisable to perform vagotomy and subtotal gastric resection simultaneously.

### *Essential Conclusions*

#### *University of Chicago*

Clinical results are excellent. Benign peptic ulcer may be regularly expected to heal if all vagus fibers to the stomach are divided.

#### *Duke*

1. Healing or quiescence of duodenal and gastric ulcers has followed transthoracic vagotomy alone. Disturbances of gastrointestinal function, however, including gastric obstruction and retention, have occurred frequently and occasionally produced serious complications. It seems probable, therefore, that vagotomy alone should not be used as a standard treatment for all duodenal or gastric ulcers resistant to medical management.
2. Stomal ulcers occurring in patients after subtotal gastric resection have healed or become quiescent following transthoracic

vagotomy. Since complications caused by retention are less serious in these patients and since conventional surgery has failed, vagotomy may be indicated as a standard treatment.

3. Transthoracic vagotomy combined with some form of gastroenterostomy has been followed by healing of ulcer, and patients have not as yet developed stomal ulcer. The incidence of symptoms of retention in this group is low.

4. Alterations of the motor and secretory functions of the stomach have usually persisted, judging by examinations made in 11 patients one to two and one-half years after vagotomy.

*Massachusetts General Hospital*

Satisfactory results have been obtained in approximately 90 per cent of the cases. Vagus resection is an addition to the surgical armamentarium which may come to occupy a permanent and important place. A reserved attitude must be maintained, however, until the present groups of patients have been followed longer.

*Mayo*

Results are inconstant, variable, and in most cases unpredictable.

# VACUUM TECHNIQUE FOR SIMPLE DEMONSTRATION OF RUPTURE OF THE MEDIAL MENISCUS OF THE KNEE

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Chronic derangements of the knee joint occur frequently. Failure to make a correct diagnosis is the principal reason for the inadequate treatment received by so many of these disabled patients. X-ray examination is often superficial and hurried. In the absence of demonstrable fracture, films are commonly reported as negative. The more alert orthopedic surgeons seem aware of the inadequacy of simple routine anteroposterior and lateral views for the examination of patients with a history of chronic knee disability. The purpose of this report is to stress the relative simplicity and the gratifying results of the "vacuum technique" method for examining the soft tissues of the knee roentgenologically.

A knowledge of the anatomy and function of the ligaments and cartilage about the knee, together with an understanding of the mechanism of their injury, is essential(1). Attention to details of the clinical history and physical findings is important if roentgenologists are to aspire to more accurate diagnoses.

Evans(2), Gershon-Cohen(1b), and Lewis(3) have emphasized the value of non-operative soft-tissue roentgenograms. Other authors(4) have covered the essentials of anatomy and mechanism of knee injuries. Differential *clinical* pictures of the varied types of injury are plentiful in the literature, but the best reports claim only 70-80 per cent accuracy of diagnosis on the basis of clinical features alone. The value of diagnostic oxygen injection into the joint has been proven(1c,5). This procedure in experienced hands is indeed most accurate. It is not feasible, however, for the average office roentgenologic practice. Some writers with wide experience in the use of oxygen injections(1c) insist that spreading of the joint is the most important step in taking satisfactory pneumoarthrograms. This spreading of the joint is the very essence of the vacuum technique.

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   (d) Abbott, L. C., Saunders, J. B. deC. M., Bost, F. C., and Anderson, C. E.: Injuries to Ligaments of Knee Joint, J. Bone & Joint Surg. 26:503-521 (July) 1944.
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Soft tissues roentgenologically demonstrable about the knee are skin and subcutaneous tissues, the large veins, the rectus femoris, the vasti, the suprapatellar space, the patellar ligament, the infrapatellar fat pad and its extensions, the gastrocnemius and hamstring tendons, the adductor muscle and its tendon, the cartilage lining of the joint, the tibial collateral ligament, the extracapsular bursae when distended, and the menisci. The vacuum technique attempts to show all of these, or at least as many as possible.

### *Technique*

The technique we have employed is essentially that outlined by Long(6). The anteroposterior exposure is made with extension cone of 10-cm. diameter at 30-inch distance, with 60-70 kilovolts and 100-125 milliampere seconds on extra-speed film contained in cardboard holder employing the Bucky diaphragm. An ordinary book braced on the immobilization band roll at the side of the table and held by an assistant acts as the fulcrum for abduction. The patient is reassured and cautioned that the radiologist will make steady rapid traction, abduction, and slight internal rotation of the lower leg, grasping the foot to exert these forces. The complete maneuver is accomplished almost as a single manipulation and completed within four seconds. Exposure is made just as abduction is completed. The patient grasps the sides of the table to prevent being pulled off. The procedure causes no pain but does require cooperation and relaxation of the patient. After this anteroposterior vacuum view is obtained, a lateral view with the knee in slight flexion is exposed for maximum soft tissue detail. A supplementary longitudinal view of the patella is made if a loose body is suspected.

### *Results*

We confirm the observation of others that the slightest excess of synovial fluid makes demonstration of the meniscus impossible(1b). Thus, the vacuum technique has no value in acute injuries with effusion (fig. 10). Like other workers, we have failed to demonstrate the articular joint space in about 20 per cent of our attempts, both in patients with a definite history of chronic knee injury and in normal controls. We have on occasion demonstrated the lateral meniscus (fig. 8), but do not feel that we have developed any degree of proficiency in the interpretation of our findings here. Fortunately, injuries of the lateral meniscus are rare.

We have used the vacuum technique in 43 patients with a history of chronic knee disability. In 31 of these cases, or 73 per cent of all trials, the procedure has afforded what we felt were satisfactory diagnostic roentgenograms. Twenty of these 31 patients have been operated upon, and it was found that, for all practical purposes, the condition had been correctly evaluated by the vacuum roentgenogram.

### *Demonstrable Abnormalities*

When the articular space is demonstrated, abnormalities which can be recognized on an acceptable film are(7):

*Abnormalities of the meniscus*

Many fractures, tears, dislocations, and so forth are shown by abnormalities in the shadow of the meniscus or in the vacuum.

a. Irregularity in the contour of either the femoral or the tibial surface shows tears, fragmentation, or shredding (fig. 3 and 4).
b. Blunting or shortening of the sharp edge indicates small tears or lesions of the cornu that distort the center of the meniscal shadow.
c. Black shadows which extend below the cartilage indicate separation from the tibial condyles (fig. 5, 8, and 9).
d. Partial or complete absence of the shadow may indicate dislocation or surgical removal.
e. Abnormally long meniscal shadows indicate a discoid meniscus. Those that are too broad are probably due to cystic change.

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6. Long, L.: Non-Injection Method for Roentgenographic Visualization of the Internal Semilunar Cartilage; Technique and Analysis of Results in 709 Examinations, Am. J. Roentgenol. 52:269-280 (Sept.) 1944.

7. (a) Blonek, F., and Wolf, J.: Pneumoradiography of the Knee Joint, J. Iowa M. Soc. 34:354-360 (Aug.) 1944.
   (b) Carty, J. R.: Soft Tissue Roentgenography; Anatomical, Technical, and Pathological Considerations, Am. J. Roentgenol. 35:474-484 (April) 1936.
   (c) Brocke, H. H. W., MacKenzie, W. C., and Smith, J. R.: Pneumoroentgenograpy with Oxygen in Diagnosis of Internal Derangements of Knee Joint, Am. J. Roentgenol. 54:462-469 (Nov.) 1945.
   (d) Dittmar, O.: Der Kniegelenks-Meniskus im Rontgenbilde, Rontgenpraxis (Hft. 10) 4:442-445 (May) 1932.
   (e) Felsenreich, F.: Darstellung des verletzten Meniscus medialis im Rontgenbild bei veralteter Kreuzband-und Seitenbandverletzung, Rontgenpraxis 7:331-333 (May) 1935.

#### *Abnormalities of the synovial cavities and bursae*

a. Suprapatellar bursa
   1. A diminished capacity indicates previous inflammation or long immobilization. Fibrous septa are normal and are frequently found.
   2. Space-occupying lesions or non-calcified tumors are usually well outlined. Small bodies which are not calcified, however, are often not visualized.

b. Infrapatellar space. Diminished capacity of the anterior joint space indicates increase in the size of the fat pad, which may be larger than normal because of trauma and may be the seat of hemorrhage, contusion, or thickening and fibrosis.

#### *Abnormalities of fat tissue*

a. The density of the tissue of the infrapatellar fat pad frequently suggests edema or fibrosis, and may appear hypertrophied.

b. Abnormal contour of the fat-pad shadow is often suggestive of severe tearing and contusion. At times rupture of the ligamentum mucosum can be recognized.

#### *Secondary findings*

Localized subarticular and subcortical bone sclerosis (fig. 3, 5, 6, and 8) opposite the site of meniscus tear is common. Asymmetrical ossification of the epiphysis, with the more narrow portion on the side of the meniscus injury, may be seen.

### *Diagnoses*

Thus, in addition to the many conditions seen on conventional roentgenograms, accurate diagnosis of the following internal derangements or associated pathologic conditions of the knee should be possible by the vacuum technique(8).

1. Separation of the cartilage from the tibial collateral ligament (fig. 2, 4).
2. Separation of the cartilage from the tibial condyle (fig. 5, 6, and 8).
3. Tear of the cartilage with or without fragmentation (fig. 4).
4. Atrophy or degeneration of the meniscus (fig. 3).
5. Rupture or tear of a portion or all of the tibial collateral ligament (fig. 1).
6. Loose bodies in the joint.
7. Peri-articular bursitis.
8. Avulsion of the insertion of the anterior cruciate ligament (fig. 3).

### *Mechanisms of Injury*

The ligaments of the knee rarely act individually, but cooperate with one another and with the muscles and menisci for any function of the knee. When the knee joint is injured, it tends to become subluxated. The capsule and/or one or more ligaments may be overstretched or completely ruptured. Palmer(4a) describes four types of subluxating violence which most frequently result in injuries to the ligaments.

#### *Hyperextension*

The posterior capsule is stretched and weakened, and fibers of the posterior cruciate ligament may be frayed; then rupture of the anterior cruciate ligament, with avulsion of the fragment of the bone from the tibial insertion, occurs.

#### *Abduction, flexion and internal rotation*

This is the most common violence. The weight of the body is thrown forward, and the femur is rotated medially while the foot is fixed. Partial tearing of the tibial collateral ligament starts; then rupture of the anterior cruciate ligament near the superior insertion, and injury to the posterior cruciate ligament's anterior insertion occur. These events are associated with injuries and tears of the medial meniscus. A compression fracture of the lateral tibial condyle may occur. When the injury fractures the tibia, the ligaments are usually not so severely damaged, but the meniscus may be.

#### *Adduction, external rotation, and flexion*

These injuries are not common. Force is applied to the medial side of the leg near the knee joint with the foot fixed. The fibular collateral ligament is the first to rupture; rupture of the anterior cruciate ligament, and often of the popliteus muscle tendon follow.

#### *Sagittal displacement*

Forcible posterior tibial displacement with the knee flexed produces a sagittal subluxa-

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8. MacAusland, W. R.: Study of Derangement of Semilunar Cartilages. Based on 850 Cases. Surg., Gynec. & Obst. 77: 111-152 (Aug.) 1943.

**Fig. 1. Simple tear of the short oblique fibers of the tibial collateral ligament from the insertion on the meniscus.**

**Fig. 2. Bucket-handle tear of the medial meniscus with avulsion of the oblique fibers of the tibial collateral ligament.**

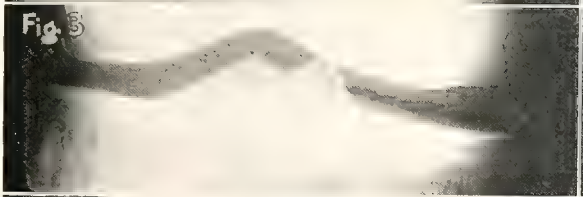

**Fig. 3. Old degenerated cartilage with numerous synovial adhesions and loose attachment of the anterior cruciate ligament. Note the localized subarticular condensation on the medial surface of the tibia, and slight degenerative arthritis of the tibial spines.**

**Fig. 4. Typical bucket-handle tear of the medial meniscus. The anterior cruciate ligament is intact and the tibial collateral ligament is intact on the fragmented meniscus.**

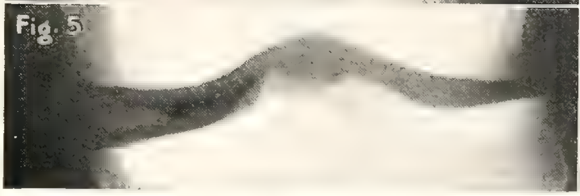

**Fig. 5. Large bucket-handle fracture and tear of the meniscus, with separation of the meniscus from the surface of the tibia. Note the subchondral condensation on the surface of the tibia.**

**Fig. 6. Old necrotic meniscus with two large fragmentations from the medial surface. The tibial collateral ligament fibers are attached to one of the fragments. Note slight subchondral bone condensation at the site of separation of the meniscus from the tibia.**

tion injury. The posterior cruciate ligament is torn and is usually avulsed from its tibial insertion with a small fragment of bone.

### *Types of Injuries*

In addition to these four types of subluxation, hyperflexion, hyperrotation, and posterior sagittal displacement of the femur on the tibia can occur. Roentgenograms made by the vacuum technique are helpful chiefly in the diagnosis of injuries resulting from the second of the four types of subluxating violence listed above. Tearing of the tibial collateral and anterior cruciate ligaments, together with injury to the medial meniscus, is the most frequently encountered combined injury. It is the most important, and, if neglected, the most disabling of injuries to the knee. It is also the simplest to evaluate by vacuum roentgenograms(9).

### *Injury to the tibial collateral ligament* (Fig. 1, 2, 4)

The commonest position in which injury to the knee joint occurs is one of abduction, flexion, and rotation medially. The tibial collateral ligament is the first structure to resist forcible exaggeration of this position. Injuries to this ligament are seen more commonly than injuries to any other supporting structure. The injury may be partial or complete, isolated or associated with other lesions—usually rupture of the medial meniscus. The types of rupture are well described by Palmer(4a) and by Abbott and his coauthors(4d). All of these cause pain and tenderness on the inner side of the joint over the attachment of the ligament(10). The short, posterior oblique fibers of the ligament are likely to be sprained or torn when the medial meniscus is ruptured. If signs of an injured

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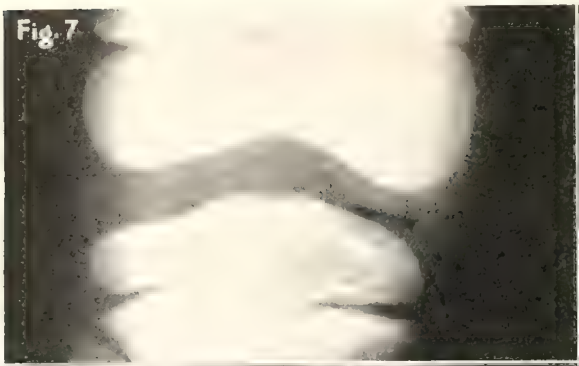
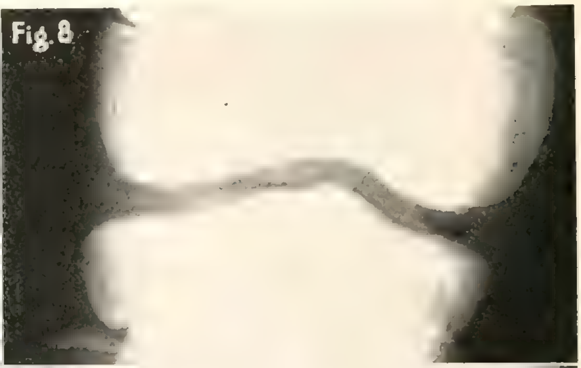
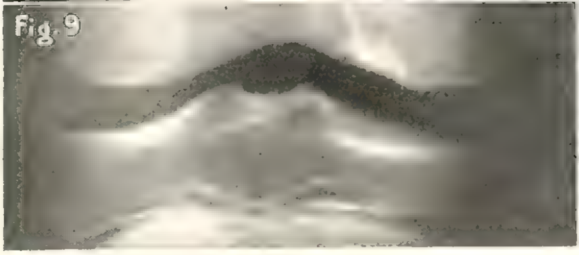
9. McMurray, T. P.: Semilunar Cartilages, Brit. J. Surg. 29: 407-414 (April) 1942.

10. (a) Nordheim, Y.: Eine neue Methode, den Gelenk-knorpel, besonders die Kniegelenkmenisken, rontgenologisch darzustellen. Fortschr. a.a. Geb. d. Rontgenstrahlen 57:179-195 (May) 1938.
(b) Quaintance, P. A.: Pneumoroentgenography of the Knee Joint, J. Bone & Joint Surg. 20:353-362 (April) 1938.







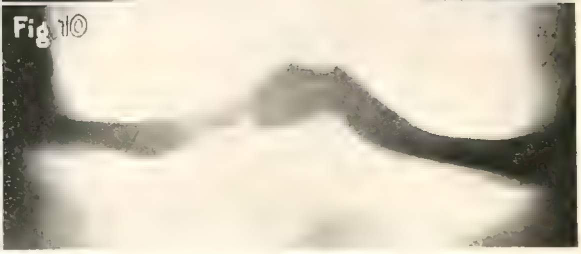


**Fig. 7. Complete bucket-handle tear of the main body of the meniscus, with locking of the torn posterior portion on the anterior portion.**

**Fig. 9 Large bucket-handle tear with findings similar to those in fig. 8. The insertion of the tibial collateral ligament is intact, but the cartilage has been separated from the surface of the tibia.**

**Fig. 8. Incomplete separation of the posterior portion of the meniscus, with long-standing locking due to overlapping of the torn meniscus. Note the defect in the articular surface of the femoral epiphysis, and asymmetrical thickening of the tibial epiphysis. The cruciate ligament is seen in the partial vacuum on the lateral side.**

**Fig. 10. History of previous operation and repair of ruptured lateral meniscus. Recent history of locking and tenderness on the medial side. A vacuum was not obtained, probably because of slight effusion. Two months later a vacuum was obtained, and a large defect in the medial meniscus was shown.**

internal cartilage fail to appear, a ruptured tibial collateral ligament is usually suspected by persistence of swelling, pain, and tenderness on the medial aspect of the knee. Recurrences are frequent when treatment of the original injury has been neglected.

X-ray evidence of acute injury to the tibial collateral ligament is meager, but films may show definite swelling or thickening of the injured portion when compared to roentgenograms of the opposite knee. Chronic injuries to the tibial collateral ligament produce fibrous thickening of the ligament, sometimes with adjacent fibrosis in the perifocal overlying subcutaneous tissues. When satisfactory roentgenograms are obtained in the chronic case, the injury is usually made evident by a distortion of the normal articular space. It is not uncommon to see the vacuum extend upward and more medially than normal, indicating avulsion of the fibers which insert on the meniscus(11). Occasionally, in severe, old injuries, it is possible to demonstrate ossifying periostitis in the region of the ligamentous insertions.

### *Injuries to the semilunar cartilages* (Fig. 2, 3, 4, 5, 6, 7, 8, 9)

Attachments of the semilunar cartilages vary considerably. Hence, different amounts of violence are necessary to effect equivalent meniscus injury in two individuals. One patient may have permanent damage from ordinary exertion on a dance floor, while a severe injury on a football field or in a skiing accident would be necessary to effect the same damage in another individual.

Usually with meniscus injury there is severe, sudden pain due to associated ligament damage. Whether locking occurs early or late, the acuteness of the symptoms is usually due to the initial sprain and swelling of the ligaments. Limitation of motion is sudden in cartilage injuries. Maximum tenderness is usually felt over the site of the tear. Since all acute meniscus injuries are associated with varying degrees of effusion, roentgen-

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11. (a) Simon, H. T., Hamilton, A. S., and Farrington, C. L.: Pneumoradiography of the Knee: Newer Technique Demonstrating Its Value in Diagnosis of the Semilunar Cartilage Injury, Radiology 27:533-540 (Nov.) 1936.
(b) Somerville, E. W.: Air Arthrography in the Diagnosis of Internal Derangements of the Knee-Joint, Proc. Royal Soc. Med. 36:663-664 (Oct.) 1943.

ographic diagnosis of acute tears by the vacuum technique is not feasible. Chronic injuries to the cartilage are, however, usually evident as irregularities of the articular space. The normal vacuum wedge is distorted. The experienced interpreter can project this distortion into his visual anatomy of the cartilage and usually describe the site of the tear.

### *Bursal Abnormalities and Other Conditions*

Normal bursae about the knee are not seen on conventional roentgenograms. When bursitis is present, however, these bursae are demonstrated. Swelling of the suprapatellar bursa and of the synovia with which it is continuous is easily demonstrated. Pretibial bursitis, found with Osgood-Schlatter's disease, is usually evident. Baker's cysts of the posterior bursa or synovial membrane may be visualized on soft-tissue roentgenograms.

Gershon-Cohen[1b] mentions cysts of the lateral meniscus, xanthomas, angiomas and fibrolipomas as additional pathologic conditions evident on soft-tissue films which demonstrate the meniscus. We have had no experience with these.

Varicosities of the popliteal and long saphenous veins and of some of their branches can be seen without difficulty. Contusions with extracapsular edema or hemorrhage can be distinguished from intercapsular swelling and confirmed by the demonstration of the meniscus.

Loose bodies arise usually from the under surface of the inner femoral condyle or from the posterior surface of the patella. Old hemorrhage may be the source of fibrin, which will later form a loose body. Necrotic synovia resulting from an arthritic process may be a source of loose bodies. These conditions are frequently missed on conventional anteroposterior and lateral views of the knee[12]. A longitudinal view of the patella, together with oblique and lateral views in flexion and extension, may reveal such elusive foreign bodies. These views are obtained, if they are thought necessary, after the vacuum technique anteroposterior view and routine lateral view have been made.

The vacuum technique for meniscus examination helps differentiate between an injury and a loose body, and often affords accurate diagnosis in cases where these two conditions, which mimic each other so often, cannot otherwise be differentiated.

### *Summary*

Roentgen examination of the knee by the vacuum technique, as advocated by Long and Gershon-Cohen, is a workable, simple procedure for office roentgenography.

Attention to a few details of the clinical history, together with an understanding of the anatomy involved, should increase the percentage of correct diagnoses in a large group of chronic knee injuries when the vacuum technique is used.

This technique is well suited to the office diagnosis of the commonest injury to the knee—that resulting from abduction, flexion, and internal rotation.

It affords the anatomic diagnosis so desirable for the surgeon without involving an operative procedure.

323 Professional Building

### *Discussion*

**Dr. Lenox D. Baker** (Durham): I want to comment particularly on two of Dr. Hemphill's references—the article by Brantigan and Voshell and that by Abbott, Saunders, Bost, and Anderson. Both are classics on the anatomy of the knee.

The vacuum technique for examining the soft tissues of the knee is not a procedure which can be done by a technician. Either the roentgenologist or the surgeon or orthopedist who has requested the study will have to be present. In my opinion, that is the biggest drawback of this method.

We have used air injections on occasion; but I don't think they offer any more information than the vacuum technique does.

**Chairman Murphy:** Dr. Hemphill, will you give us a demonstration of just what you do?

**Dr. Hemphill:** The patient lies down on his back toward the head of the table, and I get at the other end of the table and grasp his foot. We have an immobilization band that slips up and down the side of the table, which has a crank and a roll on it. This acts as a pad. We take an ordinary book—**Yearbook of Radiology** is the one we use—and put it right up beside the patient's lower femur. The patient lies down and grasps the side of the table firmly with his hands. The maneuver is explained to him carefully, because if the procedure is not done right the first time, you never will get the vacuum again for several days; the vacuum is immediately filled with normal synovial fluid (fig. 10). After the patient is so placed on the table and the book is anchored at the immobilization band, the technician starts the anode. We center just a little bit lower than usual for an anteroposterior film of the knee, because the leg is going to be pulled down. Considerable traction is required to separate the joint, but it doesn't hurt if it's done right. I place my watch

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12. (a) Schaer, H.: Der Meniskusschaden als klinisches, anatomischpathologisches und unfallmedizinisches Problem, Leipzig, Georg Thieme, 1938.
(b) Stanek, W. F.: Internal Derangements and Fractures Involving the Knee, J. Bone & Joint Surg. 27:86-94 (Jan.) 1945.

on the table and follow the second hand. In about four seconds I have completed traction and take the foot out in abduction, getting as much traction up to that time as I can. As I go into abduction, I give the foot a little internal rotation and the exposure is made.

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# REPLACEMENT TRANSFUSIONS IN ERYTHROBLASTOSIS FETALIS

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## *Etiology and Effects of Erythroblastosis Fetalis*

Some writers have called erythroblastosis fetalis an "antigen-antibody disease." This term very aptly describes the condition, in which the mother's blood is Rh-negative, while that of the baby is Rh-positive. Rh antigen from the fetus *in utero* stimulates the production of anti-Rh agglutinins in the mother's circulation(1). This procedure is analogous to the formation of antibodies in response to a vaccine or other antigen. The anti-Rh agglutinins produced in the mother find their way back to the baby's blood stream and cause destruction of the erythrocytes. Jaundice, enlargement of the liver and spleen, and mild to severe hemolytic anemia may result. If these signs are not grossly apparent at birth, they may become evident soon after delivery and may increase in severity at an alarming rate.

Unless she has previously been sensitized by an intravenous or intramuscular transfusion of Rh-positive blood or plasma, an Rh-negative mother may give birth to a perfectly normal Rh-positive baby at her first pregnancy. In subsequent pregnancies, however, the chances that she will produce an Rh-positive offspring without some evidence of erythroblastosis, either mild or severe, become increasingly remote. An Rh-negative baby, of course, will not be affected.

The severe jaundice seen in babies with erythroblastosis fetalis may cause damage to nerve tissue by deposition of bile pigments in the basal ganglia. This condition, known as kernicterus, may cause mental retardation and even idiocy(2). It is therefore imperative that an attempt be made to prevent this damage by any reasonable means.

## *Treatment by Replacement Transfusions*

It would seem logical to treat these babies by removing the anti-Rh antibodies as quickly as possible and substituting compatible Rh-negative blood. If it is possible, a complete exchange of the baby's blood for new blood free of antibodies is desirable; when this cannot be accomplished, however, as much blood as possible should be removed and replaced by compatible Rh-negative blood which will not be destroyed by the remaining antibodies.

In the past transfusions of Rh-positive blood have been advocated in order to use up all the anti-Rh antibodies. Some competent authorities have condemned this procedure as unsound. I believe that it may increase the jaundice by increasing the destruction of cells by the anti-Rh antibodies. Rh-positive blood should be used only if Rh-negative blood is not available and an emergency exists which requires immediate life-saving procedures(3).

It should be emphasized that the anti-Rh antibodies present in the baby's blood come from the mother, and will expend themselves in a short time following birth—probably three to six weeks(4). This phenomenon is comparable to the protection of a patient by the administration of tetanus antitoxin; the immunity is a passive one, and is soon exhausted.

We have used replacement transfusions in 5 cases. The procedure we employ is not as complicated as some that have been described elsewhere. The superior longitudinal sinus was utilized in each instance as the route for removal of the baby's blood. A short-bevel, 20-gauge needle and a supply of 20-cc. Luer-type syringes were used. The syringes may have to be rinsed frequently in sterile saline. The superficial veins of the scalp or extremities were used for the infusion of blood in each case except the first; in the first case the umbilical vein was used. It is important to be certain that the blood is flowing freely into the baby's vein before

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From the Babies' Hospital, Wilmington, N. C.
Acknowledgment is made to Dr. J. Buren Sidbury for his assistance and support.

1. Sidbury, J. B.: The Clinical Importance of the Rh Blood Type, North Carolina M. J. 7:606-609 (Nov.) 1946.
2. Vaughan, V. C.: Kernicterus in Erythroblastosis Fetalis, J. Pediat. 29:462-473 (Oct.) 1946.
3. Wiener, A. S. and Hyman, M. A.: Mistreatment of Congenital Hemolytic Disease by Transfusions of Rh-Positive Blood and Maternal Serum, J. Pediat. 29:498-503 (Oct.) 1946.
4. Gruber, S., Litvak, A., and Jacobi, M.: A Case of Erythroblastosis Fetalis Caused by Isoimmunization with the Agglutinogen B, J. Pediat. 29:518-519 (Oct.) 1946.

any is withdrawn from the longitudinal sinus; some of these newborn babies with a hemoglobin of only 35 to 40 per cent cannot stand a further loss of blood without showing signs of shock.

## *Case Reports*

### *Case 1*

A white male, born on October 19, 1946, weighed 6½ pounds at birth. Delivery was normal. This was the mother's fifth pregnancy. The first child, now 13 years of age, was jaundiced at birth but required no special treatment. The second child was deeply jaundiced at birth and died at 3 weeks of age. The third child was decidedly jaundiced at birth, but survived without any particular treatment. The fourth child died at 36 hours with intense jaundice.

This baby was moderately jaundiced at birth, but otherwise was in good physical condition. The blood examination at 8 a.m. on the second day showed a hemoglobin of 85 per cent, 4,170,000 red blood cells, and 15,400 white blood cells, with 4 per cent nucleated red blood cells. At 6 p.m. on the same day the hemoglobin was 78 per cent, the red blood cell count 3,900,000. That night 60 cc. of blood was withdrawn from the longitudinal sinus and 120 cc. of Rh-negative blood was given through the umbilical vein.

Subsequent blood examinations were as follows:

| *Date* | *Hgb.* | *RBC* | *WBC* | *Blood given* |
|---|---|---|---|---|
| Oct. 21 | 90% | 4,300,000 | 8700 | 55 cc. |
| Oct. 22 | 85% | | | |
| Oct. 23 | 88% | 4,100,000 | | |
| Oct. 24 | 90% | 4,000,000 | | |
| Oct. 25 | 97% | | | |
| Oct. 26 | 90% | 4,500,000 | | |

When the baby was ready to leave the hospital a swelling of the left hip was noticed. No elevation of temperature or of the white blood cell count was present, but the next day the right knee was swollen and edematous. Blood cultures were negative. An x-ray showed only soft-tissue swelling. Subsequent examinations revealed some limitation of motion, and another x-ray showed healing periostitis and a moderate amount of bone destruction of the head of the tibia with some flattening. The only explanation for the bone changes which could be postulated was the very severe metabolic disturbance which the baby had experienced. Wassermann tests on both the mother and the baby were negative.

### *Case 2*

This baby was born on January 27, 1947, after a three-hour labor with forceps delivery. His birth weight was 7½ pounds. He was quite jaundiced when he was admitted to the Babies' Hospital on January 31, 1947. Rh tests showed the mother to be Rh-negative, the father and the baby Rh-positive. This was the mother's fourth pregnancy. The first pregnancy had resulted in a miscarriage at six months. The second pregnancy produced a normal girl with no signs or symptoms of erythroblastosis. The third pregnancy terminated in a miscarriage at three months.

The blood examination on admission showed a hemoblogin of 62 per cent, 3,000,000 red blood cells, and 8300 white blood cells; no nucleated red blood cells were seen. A blood count made at the referring hospital the morning before admission to the Babies' Hospital was reported as showing 90 per cent hemoglobin and 4,300,000 red blood cells. Because of the rapid drop in the blood count, 75 cc. of whole blood was given to the baby on the night of admission. On the following morning 150 cc. of blood was withdrawn from the longitudinal sinus and 230 cc. was given. Subsequent blood examinations were as follows:

| *Date* | *Hgb.* | *RBC* | *Blood given* |
|---|---|---|---|
| Feb. 1 | 64% | | 150 cc. |
| Feb. 1 (after transfusion) | 95% | | |
| Feb. 3 | 98% | 4,900,000 | |
| Feb. 4 | 86% | 4,750,000 | |
| Feb. 8 | 80% | | |
| Feb. 11 | 74% | 4,000,000 | 75 cc. |
| Feb. 12 | | | 75 cc. |
| Feb. 14 | 96% | 4,900,000 | |

### *Case 3*

A child born on March 2, 1947, and weighing 6½ pounds at birth was admitted to the Babies' Hospital at 5 days of age with a history of jaundice, increasing in intensity, since birth.

The mother's first pregnancy had terminated in a miscarriage at four months, the second in a miscarriage of twins at seven months. The mother received two transfusions at that time, and had a reaction from one of these. The mother was Rh-negative, the father and the baby Rh-positive.

The child was deeply jaundiced when he was admitted on March 9, and the blood examination showed a hemoglobin of 20 per cent and 1,900,000 red blood cells. Sixty cubic centimeters of blood was withdrawn, and 180 cc. given. The hemoglobin was then found to be 64 per cent, and there were 20 per cent nucleated red blood cells. Subsequent blood counts were as follows:

| *Date* | *Hgb.* | *RBC* | *Nucleated RBC* | *Blood given* |
|---|---|---|---|---|
| March 10 | 58% | 3,050,000 | 15 per cent | 70 cc. |
| March 11 | 65% | | 2 per cent | |
| March 12 | | | | 80 cc. |
| March 13 | 90% | | | |
| March 15 | 85% | | | |
| March 22 | 85% | | | |
| March 24 | 70% | | | |

### *Case 4*

This baby was admitted to the Babies' Hospital on March 15, 1947, when he was twenty days old. He had been mildly jaundiced since birth. The mother was Rh-negative, the father and the baby Rh-positive. There was one other child 5 years of age, whose past history was negative.

The baby's hemoglobin was 38 per cent, and his red cell count 1,000,000 on admission. That day 120 cc. of blood was withdrawn and 220 cc. given, and the following day 60 cc. of blood was given. The next day the hemoglobin was 90 per cent. On March 19, 60 cc. of blood was given, and on March 22 the hemoglobin was 95 per cent; the following day it was 108 per cent and there were 5,250,000 red blood cells. The baby was discharged on March 26, with a hemoglobin of 104 per cent and 5,100,000 red blood cells.

### *Case 5*

A female infant born on July 3, 1947, and weighing 7 pounds, 4 ounces, was mildly jaundiced at birth and the spleen was easily palpable; otherwise her appearance was normal. The possibility that the baby would be erythroblastotic had been established by Dr. Lounsbury, the obstetrician in charge. The mother was Rh-negative. This was her first full-term pregnancy, but she had had a ruptured tubal pregnancy three years ago. At that time she received two blood transfusions from donors whose

Table 1

| *Date* | *Hgb* | *RBC* | *WBC* | *Polys.* | *Lymphocytes* |  | *Nucleated RBC* |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  | *Large* | *Small* |  |
| July 5 | 102% | 5,000,000 | 10,000 | 78 | 32 |  | 5-10% |
| July 7 | 110% | 5,750,000 | 7,600 | 36 | 64 |  | None |
| July 10 | 116% | 5,600,000 | 8,400 | 43 | 57 |  | None |
| July 15 | 102% |  |  |  |  |  |  |
| July 17 | 104% | 5,200,000 | 8,100 | 46 | 63 | 1 |  |

Rh group was not determined. There was no history of immediate or delayed reactions, possibly because the time elapsing between transfusions was insufficient to permit the development of anti-Rh agglutinins.

On May 6, 1947, the anti-Rh titer of the mother's blood, determined by the Blood Grouping Laboratory in Boston, was found to be 1:32. Dr. Diamond predicted from this test that the mother would give birth to an erythroblastotic baby.

The baby's blood was typed and the Rh group determined immediately after delivery. Her blood was found to be Rh-positive, type A. The hemoglobin was 84 per cent, red blood cells 3,900,000, white blood cells 14,000, the distribution between polymorphonuclears and lymphocytes being approximately equal. There were 20 per cent nucleated red cells. Another blood count at 8 p.m. showed the hemoglobin 80 per cent, the red cell count 3,900,000, and the white cell count 12,100, with 74 per cent polymorphonuclears, 26 per cent lymphocytes, and 15 to 20 per cent nucleated red cells. At this time the baby was markedly jaundiced and the spleen was felt well below the costal margin.

A special nylon catheter was inserted in the umbilical vein with some difficulty and approximately 50 cc. of blood was withdrawn and 75 cc. of type A Rh-negative blood was administered. This procedure was continued until 300 cc. of blood was withdrawn and 340 cc. injected. The catheter then became clogged and the transfusion was stopped. An additional 60 cc. of blood was given the following day.

The blood picture during the remainder of the baby's hospital stay is shown in table 1.

The patient progressed satisfactorily and was discharged from the hospital on July 18, 1947. She was still definitely jaundiced and the spleen, although smaller, was readily palpable. The baby did not need further blood, however. This was the result we had hoped for. In cases treated by transfusions not of the replacement type repeated transfusions had been necessary.

### *Discussion*

In each of these cases the mother was Rh-negative, the father and the baby Rh-positive. Only Rh-negative blood was given, and each of the babies recovered and was discharged from the hospital in good condition.

An average of 430 cc. of blood was given in divided transfusions, and an average of 110 cc. of blood was withdrawn as soon after admission as possible. None of the patients have required admission for further transfusions.

These results are more spectacular when compared with the 4 consecutive cases of erythroblastosis fetalis treated by us just before this series was begun. In that group one baby was given four transfusions during the first few days of life; at 11 weeks his hemoglobin dropped back to 62 per cent, and he was given an additional 330 cc. of blood. Following this he made an uneventful recovery. The second baby was given 140 cc. of blood between the third and seventh days of life. At 3 weeks of age her hemoglobin had dropped to 40 per cent, and she was admitted again and given 180 cc. of blood. Her twin sister was not anemic at birth, but at the age of 3 weeks her hemoglobin was only 48 per cent. She was given 190 cc. of blood, and has been all right since. The fourth patient was given 280 cc. of blood at 5 weeks and has made an uneventful recovery.

### *Summary*

Since erythroblastosis fetalis is an antigen-antibody disease, it is desirable to remove as much as possible of the passively acquired anti-Rh agglutinin from the baby's blood stream. It is felt that the replacement transfusion is the procedure of choice in these patients. Five cases are presented in which this method of treatment was employed.

### *Discussion*

**Dr. John R. Ashe** (Charlotte): At the Pittsburgh meeting of the American Academy of Pediatrics, there was a three-and-a-half-hour session on erythroblastosis, headed by Dr. Wiener. The point was brought out that if an erythroblastotic baby is expected from the family history, the obstetrician should be asked to leave the umbilical cord about six inches long. It is then very easy to use the umbilical vein for replacement transfusions.

**Dr. Knox**: Dr. Diamond uses large quantities of blood and goes so far as to titrate the blood being removed for anti-Rh antibodies. When the titer reaches zero, he stops the transfusion. That procedure is ideal.

**Dr. Marion Keith** (Greensboro): I think the sensible thing is to treat these babies early, before destruction of the red cells occurs. If we could get together and have an Rh-negative blood bank, one obstacle would be eliminated. In Greensboro we are having a terrific time trying to get these Rh-negative donors. We try to have donors ready in advance when we know there is a possibility that the baby will be erythroblastotic.

I think it would be well if this Society should go on record as favoring the establishment of an Rh-negative blood bank.

**Dr. F. B. Haar** (Greenville): I read somewhere that the isoantibodies are present in breast milk of the mother.

**Dr. Knox:** We routinely take babies off the breast when they have any symptoms of erythroblastosis.

**Dr. W. E. Keiter** (Kinston): The most difficult thing is to select the babies for treatment. Even Dr. Wiener told us at Pittsburgh that 60 per cent recover spontaneously, and the mortality from transfusion procedures is rather high.

**Dr. Knox:** I don't think the mortality from the transfusion itself is prohibitive. Since it is the antibodies which cause the harm, it seems to me that the procedure of choice is to remove as many of the antibodies as possible.

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# POLYDIURNAL ELECTRIC SHOCK TREATMENT IN MENTAL DISORDERS

Edward A. Tyler, M.D.
*and*
Hans Lowenbach, M.D.
Durham

The treatment of many mental disorders with artificially induced convulsions is today widely accepted. The mechanism by which convulsive "shock treatment" effects improvement is as obscure today as it was when Meduna, in 1935, introduced metrazol as a convulsive agent, or Cerletti and Bini, in 1938, the brief passage of electric current through the anterior part of the skull(1).

## *The Importance of Confusion Following Electric Shock*

Each convulsive treatment is followed by a period during which the patient's intellectual functions are severely impaired. Disorientation and loss of recent and remote memory, of judgment, of many inhibitions, and of initiative are easily demonstrated. At the same time, the patient shows a remarkable lack of concern over this state of affairs, and if anxiety or excitement were part of his psychotic picture, both will disappear for at least this interval(2).

This period varies greatly from patient to patient, sometimes ending after a few minutes, sometimes extending over several hours. It is impossible to predict, with certainty, whether a given patient will react to the electric shock with a long or with a short period of confusion. In general, it appears that the period of confusion is longer and more marked if the patient has been ill only for a short time. In contrast, patients with a psychosis of long duration and with symptoms mainly of systematized delusions remain confused only for a short time and quickly exhibit again the psychotic symptoms for which they are being treated. If convulsive treatment is repeated before the confusion of the previous treatment has completely disappeared a cumulative effect takes place and the resulting confusion will be more intensive and will last longer.

We gained the impression that patients who had an extended period of post-convulsive confusion tended to improve more readily than patients in whom this effect was absent. On the basis of this possible correlation between post-shock confusion and ultimate recovery, we began, in January, 1942, to let shock treatments follow each other so closely that extensive and long-lasting confusion resulted. To provoke such confusion patients have to be given up to four electric shocks per day, sometimes for several days in succession.

## *Possible Dangers of Polydiurnal Shock Treatment*

We had to consider the possibility that this form of treatment might not be without harm to the patient. No help, in this respect, could be found in the literature. Most authors seem to favor, without any other reason apparently than that of tradition or inertia, to give treatments two or three times weekly. In a few articles it is suggested that treatments be given daily. For the control of excited and unmanageable patients, treatments more than once daily have been recommended(3). Many epileptics have several *grand mal* seizures per day without a greater incidence of fractures, dislocations, or other accidents than among other patients with fewer convulsions. The danger of producing

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Read before the Section on Neurology and Psychiatry, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

1. A comprehensive review on shock therapy is contained in: Stainbrook, E.: Shock Therapy; Psychologic Theory and Research, Psychol. Bull. 43:21-60 (Jan.) 1946.
2. Lowenbach, H. and Stainbrook, E. J.: Observations on Mental Patients after Electroshock, Am. J. Psychiat. 98: 828-833 (May) 1942.
3. (a) Kerman, E. F.: Electroshock Therapy, with Special Reference to Relapses and an Effort to Prevent Them, J. Nerv. & Ment. Dis. 102:231-242 (Sept.) 1945.
   (b) Lowenbach, H.: Electric Shock Treatment of Mental Disorders, North Carolina M. J. 4:123-128 (April) 1943.
   (c) Hemphill, R. E. and Walter, W. G.: The Treatment of Mental Disorders by Electrically Induced Convulsions, J. Ment. Sc. 87:256-275 (April) 1941.
   (d) Kalinowsky, L. B.: Electric Convulsive Therapy, with Emphasis on Importance of Adequate Treatment, Arch. Neurol. & Psychiat. 50:652-660 (Dec.) 1943.

an organic lesion which might later become the focus for spontaneous convulsions could be regarded as negligible. The possibility existed that the confusion might become permanent, or the lasting memory deficit so big that the patient would be equally as handicapped as if he had remained psychotic. In our experience, however, the confusion accidentally occurring after the conventional form of electric shock treatment always disappears, and only certain periods, especially the time of the treatment, cannot be recalled to memory. Similarly, Freeman and Watts(4) state that prefrontal lobotomy precipitates a period of confusion and loss of initiative which is only temporary and enhances, rather than detracts from, the curative effect of the operation. Finally, as we proposed to treat only those patients whose prognosis was bad and who might otherwise become permanent inmates of a mental hospital, we felt justified in risking a possible partial reduction of intellectual capacity.

### *Duration of Treatment*

The goal of polydiurnal treatment is the production of extensive confusion and not the administration of a certain number of convulsive shocks. Often the four shocks given on the first day suffice to produce confusion which is evident and extensive on the following day. In that case, shocks are repeated only once or twice daily to maintain and to intensify this confusion so that it lasts at least one week.

### *Classification of Cases*

Of the 32 cases reported here, 19 were patients of the Duke University Hospital and 13 were patients of the North Carolina State Hospital at Dix Hill(5). In tables 1, 2, and 3 the essential data concerning these patients are presented. They have been divided into those living at home and working full time, those living at home but unable to work after a short period free of symptoms, and those living in custodial institutions. The case history of one patient is presented in detail below.

### *Case Report*

The patient was a 35-year-old white, married man whose illness began about six months before his admission to Duke University Hospital in December, 1945. Toward the end of April, 1945, the patient started to feel "jittery," lost his appetite, and slept badly. In June, 1945, he felt that people were talking behind his back and were referring to his habit of wrinkling his brow when he was thinking. He believed that a friend, previously his boss, was putting him on trial at the shipyard where he was employed. As yet, he was unable to understand the purpose of the trial.

In July, 1945, he believed that a close friend of his had been killed, and this idea produced "a nervous breakdown," during which he had to stop working. He began to feel that radio programs were referring to him. A month later, he had to pay notice to license plates on automobiles and had to repeat their numbers over and over in his mind. He could not control his thoughts, and vulgar terms, predominantly of a homosexual nature, would run through his head. He would think of a name or of a city and feel that he was branding all the people there as homosexual. This habit he somehow connected with the reason for his being involved in a trial. In September, 1945, he heard voices making remarks of a derogatory sexual nature and referring to him in the third person.

At this time he was admitted to a private mental institution and received five electric shocks in two weeks. He was much improved and, for financial reasons, went home.

He remained asymptomatic for only two weeks, when all of his symptoms returned and he came to the outpatient clinic of Duke University Hospital. He was neatly dressed, very cooperative, smiling and friendly. He moved his head about a great deal as if perplexed. He showed some tendency to repeat himself and occasionally groped for words. He was very positive in his complaints, which were those just described. There were occasional glimpses of insight. In addition, he admitted frequent suicidal wishes. The patient was fully oriented and his recent and remote memory was good. His intelligence quotient (Bellevue-Wechsler scale) was 92.

The patient is the third of four children in a rural family. All siblings are alive and well. His birth and early development were normal. The patient was slow to learn, but graduated from high school and has done well as a store clerk. He has always been rather shy but never seclusive. He has many friends, takes an occasional social drink, and smokes a great deal. He is fond of athletic events. He attends the Methodist church regularly.

He began masturbation at the age of 12 with much guilt feeling, and on two occasions practiced fellatio on an older brother. From the age of 16 until he married, he had intercourse every few months with different women. At the age of 29 he married a woman four years his junior and this marriage has been successful. He has one son, now 4 years old.

Neurologic and physical examinations revealed no abnormalities. Serologic tests for syphilis were negative. X-rays of the spine showed a compression fracture of the fourth and of the eighth thoracic vertebrae—possibly a result of the shock treatment received at the other hospital.

The patient could not be admitted at once because no bed was available. While waiting at home for admission, he made a suicidal gesture and was brought in shortly afterwards. Electric shock treatment was started one day later, since the patient had already been examined in the outpatient clinic.

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1. Freeman, W. and Watts, J. W.: Psychosurgery; Intelligence, Emotion, and Social Behavior Following Prefrontal Lobotomy for Mental Disorders, Springfield, Illinois, C. C. Thomas, 1942.

5. The cooperation of the medical and administrative authorities of the North Carolina State Hospital at Dix Hill is gratefully acknowledged.

Within seventy-two hours he was given thirteen electric shocks, all with major reactions. Except for 0.1 Gm. of seconal on the night of admission and an occasional aspirin, the patient received no drugs while in the hospital.

The patient was in the hospital for a total of twenty-two days. Every night except the third, fourth and fifth nights after electric shock treatment had been started, he slept seven or more hours. During this time he showed much confusion and some nocturnal restlessness. The temperature rose to 37.8 C. at the end of the first five treatments, but was normal again on the next day. The patient lost 1½ Kg. (3.3 pounds) of weight during the first week, but regained it before discharge. The x-ray of the spine taken before discharge showed a doubtful additional compression fracture of the seventh thoracic vertebra.

After each shock the patient had a short period of confusion, but at the end of the first day he was still fully oriented as to time, person and place, and could relate the symptoms given above. At the end of the second day, when he had had nine electric shocks, the patient was oriented only as to person, but could not recall his symptoms. He thought he was 26 years of age, unmarried and childless. It is interesting to note that he still retained some judgment. For example, when asked, "How many children have you?" he replied, "You know I can't have children; I just told you I was not married." At the end of the third day, after thirteen shocks, the patient thought he was 19 and lived on a farm. He

### Table 1

### Patients at Home, Asymptomatic, Working Full Time

| *Sex* | *Diagnosis* | *Age* | *Duration of Illness* | *No. of Shocks* | *No. of Treatment Days* | *Hospital Days after Treatment Ended* |
|---|---|---|---|---|---|---|
| **Duke Hospital** | | | | | | |
| M | Paranoid schizophrenia | 35 | 6 months | 13 | 4 | 18 |
| F | Paranoid schizophrenia | 25 | 6 months | 11 | 9 | 13 |
| M | Catatonic excitement | 21 | 4 days | 19 | 9 | 19 |
| F | Hebephrenic schizophrenia | 15 | 11 days | 22 | 11 | 34 |
| F | Mixed schizophrenia | 20 | 1 month | 12 | 4 | 7 |
| F | Agitated depression | 48 | 2 days | 16 | 8 | 11 |
| M | Alcoholic paranoia | 31 | 1 month | 8 | 2 | 8 |
| **State Hospital at Dix Hill** | | | | | | |
| F | Catatonic excitement | 26 | 7 months | 10 | 4 | 30 |
| M | Mixed schizophrenia | 28 | 21 days | 12 | 3 | 1½ years* |
| F | Agitated depression | 48 | 3 months | 7 | 3 | 15 |

*This patient could not be discharged earlier for domestic, non-psychiatric reasons.

### Table 2

### Patients at Home Now, Socially Improved, Not Working or Working Part Time

| *Sex* | *Diagnosis* | *Age* | *Duration of Illness* | *No. of Shocks* | *No. of Treatment Days* | *Hospital Days after Treatment Ended* |
|---|---|---|---|---|---|---|
| **Duke Hospital** | | | | | | |
| M | Depression | 35 | 6 months | 10 | 3 | 8 |
| F | Paranoid schizophrenia | 24 | 3 years | 9 | 3 | 20 |
| M | Paranoid schizophrenia | 27 | 3 months | 12 | 3 | 19 |
| M | Paranoia | 48 | Several years | 13 | 4 | 22 |
| F | Agitated depression | 29 | 8 years | 16 | 6 | 10 |
| M | Paranoid schizophrenia | 27 | 3 months | 5 | 3 | 1* |
| M | Depressive stupor | 32 | years | 10 | 3 | 35 |

*This patient did not develop confusion, but improved so much that the family demanded his discharge.

### Table 3

### Patients Requiring Custodial Care

| *Sex* | *Diagnosis* | *Age* | *Duration of Illness* | *No. of Shocks* | *No. of Treatment Days* | *Hospital Days after Treatment Ended** |
|---|---|---|---|---|---|---|
| **Duke Hospital** | | | | | | |
| F | Hebephrenic schizophrenia | 24 | 3 years | 11 | 3 | 11** |
| M | Paranoid schizophrenia | 39 | 15 years | 12 | 8 | 15** |
| F | Manic excitement | 30 | 2 months | 6 | 2 | 22 |
| F | Hebephrenic schizophrenia | 17 | 18 months | 13 | 5 | 36 |
| F | Psychopathic personality | 15 | 5 years | 5 | 3 | 7 |
| **State Hospital at Dix Hill** | | | | | | |
| F | Agitated depression | 32 | 1½ years | 10 | 4 | —** |
| F | Schizophrenia | 23 | Several years | 10 | 4 | —** |
| F | Hebephrenic schizophrenia | 19 | 8 months | 10 | 4 | —** |
| F | Hebephrenic schizophrenia | 19 | 3 years | 10 | 4 | —** |
| M | Paranoid schizophrenia | 31 | 4 months | 12 | 3 | —** |
| M | Schizophrenia | 25 | 14 months | 12 | 3 | —** |
| F | Schizophrenia | 24 | 1 year | 6 | 4 | —** |
| F | Paranoid schizophrenia | 31 | 14 months | 12 | 4 | —** |
| F | Agitated depression | 40 | 6 months | 10 | 4 | —** |
| F | Schizophrenia | 29 | 1 year | 12 | 3 | —** |

*The patients at Duke Hospital were discharged into custodial care.

**Temporary improvement lasting not more than a few weeks.

believed that he worked at a previous job. He staggered a great deal and complained of backache. He was oriented only in regard to person.

The fourth day the patient was very much confused and was unable to understand even simple instructions. His speech was thick and slow, and frequently unintelligible. When given food or water, he sat swishing it around in his mouth without swallowing it. He resisted going to the toilet, but he never became ill-tempered. He began letting saliva drool from his mouth and voided upon the bedroom floor. He slept only a couple of hours that night, but remained quiet. The fifth day he said he felt better and talked a little spontaneously. He was unable to remember his name when asked, but responded to it when called. He ate well, but slept poorly. The sixth day he got up early, went promptly to the bathroom and started washing his face and hair, but repeated this action until interrupted. He now thought he was in his twenties, unmarried, and working in a grocery store. He began to complain of things whirling about him and would frequently say, "This elevator is going up too fast." That night he would not stay in bed, but roamed about the hall and disturbed everyone. The seventh day, he wandered about the hall trying to unlock doors and spoke of getting ready to go to work in a few minutes. He would now dress spontaneously, but was slow initiating each new action. He begged to be allowed to go out and look for a job. He wanted to make a long-distance call regarding coming to work the next morning.

During the first part of the second week after the shock therapy, his main interest was in playing ping-pong. He gradually remembered being about 30 and being married, but not that he had a child. He was friendly and cooperative with all the attendants and other patients. In the third week, the patient regained most of his memory except for a period extending back almost one year. He was totally unable to remember having been sick or having worked in the shipyard. In this condition he was discharged on the twenty-first day after the treatment had started.

The patient was seen as an outpatient on April 22, July 17, and December 1, 1946. He had taken his old job at the grocery store on January 11, 1946, and missed no time from work except on the three days when he came to the clinic. He was sleeping well and eating regularly. He again enjoyed going to baseball games, listening to the radio, and taking his wife out for the evening. He had no memory of his illness. He was content to say that he had a "nervous breakdown." He has been told that he had attempted to cut his throat; he was little concerned about that and felt that it was caused by his nervousness. His friends were unable to notice any difference in his behavior from that which he exhibited long before he became ill. Occasionally he is embarrassed by having someone speak to him and not remembering having met him before.

On April 28, 1947, the patient returned for another clinic visit. At this time the Bellevue-Wechsler examination was repeated, and his full-scale intelligence quotient was 108—a gain of 16 points over the rating obtained during his psychotic, pre-shock period.

### *Discussion*

There is general agreement that electric shock treatment is most effective against depression, regardless of origin, and against catatonic schizophrenia of short duration, and that it is least beneficial to patients suffering from the hebephrenic and paranoid forms of schizophrenia. We had hoped that polydiurnal electric shock treatment might provide a tool with which to help, in many instances, those psychotic patients whose symptoms otherwise are not lastingly affected. Unfortunately, no certain differences seem to exist, in this respect, between the result that we obtained with the intensive treatment and the results that could have been obtained with the conventional form of electric shock treatment, with metrazol, or with insulin shock. All of our patients who had been diagnosed as suffering from hebephrenic schizophrenia showed, with one exception, temporary and only spurious improvement and are today still inmates of a mental hospital. The exception was a girl of 15, and one may well doubt the correctness of the diagnosis in this case. On the other hand, however, one could question whether all of the paranoid schizophrenics whom we treated would have recovered or improved without intensive treatment. Some of them actually had received shock therapy previously in other hospitals without benefit.

One advantage of this method appears when one compares the average number of hospital days for patients under conventional electric shock treatment and for those with polydiurnal treatment. If comparison is made with insulin treatment, the difference is even more impressive. This shortening of the hospital stay is no small advantage when one remembers the shortage of hospital facilities for mentally ill persons and the even greater scarcity of trained professional personnel. The more rapid and effective the method of treatment, the greater the number of patients who can be given a therapeutic trial.

We believe that electric shock therapy, in most instances, could be completed in four or five days and that its effectiveness could be determined in a much shorter time than at present. The patient could be discharged as improved or transferred to custodial care much sooner, thus freeing a therapeutic bed for another untreated patient. The financial and emotional gains to the patient, his relatives, and the community are obvious.

In accordance with our expectations, the dangers from polydiurnal treatment are not greater than those of conventional electric shock. The dangers of both methods are much less than those of deep insulin shock. Spontaneous convulsions have not developed in any of our patients, although some of the treatments date back five years. The confusion, often deep and all-pervading, has cleared in all cases, and fine psychologic tests are necessary, as after other shock treatments, to demonstrate permanent impairment. Certainly no significant loss of judgment is exhibited by the patients thus treated if they recover from their mental illness. The difficulties of speech and gait which frequently occur in our patients during polydiurnal treatment disappear even in those patients who remain psychotic.

Our experience has intensified our conviction that confusion is a beneficial and therapeutically desirable effect of electric shock in the treatment of mental disorders other than exclusively depressive states. Polydiurnal shock treatment achieves this aim faster and more effectively than electric shock given at a slower rate, where confusion usually appears first in the third treatment week, and is often much too superficial. The number and the frequency of treatments should not be determined by the magic of numbers, like ten or twelve, but should be governed by the degree of confusion.

### *Summary*

Polydiurnal electric shock—that is, more than one shock per day—was given to 35 psychotic patients. Four major convulsions per day for as many as three days are not more dangerous than the conventional form of electric shock treatment. After following all of these patients for periods varying from one to five years, we find no significant residual impairment of function in intellectual capacity nor any evidence of localized brain damage. The number of patients who recovered was not appreciably different from that found after other forms of shock therapy, and no certain relationship seems to exist between probability of recovery and the pattern with which the shocks are given. However, the period of hospital treatment can be shortened quite considerably by a method of therapy no more dangerous than other shock therapies and requiring less trained professional personnel than deep insulin shock treatment.

Post-convulsive confusion is a beneficial and therapeutically desirable effect of electric shock in the treatment of mental disorders other than exclusively depressive states. The number and the frequency of treatments should be determined by the degree of confusion.

### *Discussion*

**Dr. David A. Young** (Raleigh): Dr. Tyler and Dr. Lowenbach should be complimented on their work and on their conservative conclusions, with which I am in general agreement. The remarks that I have to make exceed, in some respects, the limits of the paper.

The advisability of any procedure such as this is determined to a considerable extent by the possibilities which might be expected in the individual without treatment or with other forms of treatment which are less serious. The point made in the paper that the treatment should be begun early and that the most satisfactory results were obtained in patients who were treated very early in the course of their disease agrees with the findings of other psychiatrists.

I heartily commend the authors for stating that we should not set any "magic number" as the number of treatments which should be given. In the early days of shock treatment, patients were subjected to a particular number of treatments, called a "course." If they did not recover after this, they were said to need a second or third "course." The number of treatments which constituted a "course" varied greatly from doctor to doctor. I agree with Dr. Lowenbach and Dr. Tyler that the number of treatments should be governed by individual consideration of the effect of shock treatment on the individual, and that another treatment should be given at the time it seems to be needed.

The authors' conclusion that the number of patients who recovered following this form of treatment was not very much greater than the number which might be expected to recover following other forms of shock treatment may tend to dispel a false idea that the effectiveness of shock therapy is in direct proportion to the number and intensity of the treatments.

It appears to me that we have in psychiatry at the present time a situation which is quite similar to that in general medicine: the use of electric shock, insulin shock, insulin sub-shock, insulin with electric shock, or insulin with the use of some sedative in certain types of psychiatric disorders is analogous to the trial of penicillin, sulfonamides, penicillin and sulfonamides, or streptomycin in certain infectious diseases. We try first one thing and then another, and the emphasis is placed altogether on treatment. The result may be very good, but the availability of so many methods of treatment unfortunately takes the therapist away, to some extent, from the understanding of the condition he is treating. The psychotherapeutic angle should not be neglected simply because other methods of treatment are available.

I would be interested in any further details which the authors might give in regard to the choice of patients for this special kind of treatment, and also any further elaboration of their reasons for stressing the confusion as such a prominent factor in recovery. I hope that out of such work as this may come a sound practical and theoretical basis for the whole matter of shock treatment.

**Dr. Lowenbach:** Since we put together the data for this paper, many more patients have been treated with polydiurnal shock with good results. We think it is indicated for patients suffering from schizophrenia, especially of the paranoid and hebephrenic type, and for patients with agitated depression. We use it also in patients with other psychoses, if time is an important factor.

The reasons for stressing confusion as a therapeutically valuable factor are derived entirely from experience. It is my impression that the more normally integrated the intellectual and emotional functions of an individual, the stronger will he react with confusion to electric shock. Patients with depression or with another psychosis of relatively short duration show confusion of several hours after a single treatment, while a patient with paranoia, for example, will exhibit his delusional system within a very short period after the end of the convulsion. If one spaces the treatments close together, one can gradually extend the period of confusion in the latter patients also, and achieve improvement which would probably not occur otherwise. Expressed quite primitively, it seems to be necessary to "insult" the central nervous system more intensely if one wants to "reach" pathologic associations of long duration. In patients with simple depression, on the other hand, this is not necessary. However, confusion will usually not harm them and valuable time can often be saved.

## SKIN TESTS IN PSYCHOSES

### *Reactions to Specific and Non-Specific Substances in Institutionalized Psychotic Individuals*

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In the course of a study on trichinella skin tests in patients in psychiatric institutions, the incidence of positive reactions in a small group of individuals with acute psychoses was found to be four times as great as in convalescent patients. This finding suggested the possibility that the skin response to biologic products might be altered in different stages of psychosis. It has been reported that the electrical resistance of the skin varies markedly in the same individual as he recovers from the acute phase of a psychosis(1). The present study was undertaken to determine the responses of psychotic individuals in different phases of their illness to several specific and non-specific skin-test substances.

### *Materials and Methods*

*Subjects*

Two hundred and eighty-eight white females at the North Carolina State Hospital in Raleigh were chosen for this study. All subjects had been institutionalized at least one year continuously, had an identical food and water supply, and had had no active therapy—that is, convulsive therapy—which might have altered the course of the psychosis. The ages ranged from 16 to 82 years; the duration of institutionalization, from one to forty years.

These patients were divided into three groups, as follows:

Group I—deeply psychotic. The 147 patients in this group had been removed from the wards and placed in buildings reserved for those violently disturbed.

Group II—mildly psychotic. The 91 patients in this group were allowed to remain on the wards, where a certain degree of cooperation and self-sufficiency is required.

Group III—convalescent. These 50 patients had improved sufficiently to be cared for in a separate building, analogous to a rest home, where a minimum of supervision is required.

*Materials*

The substances used for skin-testing were:

(1) Old tuberculin (OT), 1:1000, 0.1 mg. per dose
(2) Purified protein derivative of tuberculin (PPD), 0.005 mg. per dose
(3) Histamine phosphate, USP XII, 0.01 mg. per dose
(4) Ascaris antigen(2), 0.0002 mg. of nitrogen per dose
(5) Trichinella antigens(2), 0.002 mg. per dose
(6) Coccidioidin(2), 0.1 mg. per dose
(7) Lecithin and acacia, 1 mg. of lecithin and 6 mg. of acacia per dose
(8) Physiologic saline solution, 0.1 cc.

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From the Department of Internal Medicine, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, and the North Carolina State Hospital, Raleigh.

This study was aided by a grant from the John and Mary R. Markle Foundation.

1. Barnett, A.: Correlations between Epidermal Impedance and the Clinical Course in Certain Psychoses, Proc. Soc. Exper. Biol. & Med. 42:839-843 (Dec.) 1939.
2. We are indebted to Drs. D. T. Smith and N. F. Conant of the Duke University School of Medicine for furnishing us with coccidioidin, and to Lederle Laboratories for the trichinella and ascaris antigens.

The above doses of OT, PPD, histamine, coccidioidin, and lecithin and acacia were each contained in 0.1 cc. of physiologic saline, and the trichinella and ascaris antigens were contained in 0.02 cc. They were injected intradermally in the back in the same pattern.

Physiologic saline solution was employed as a control for the immediate reaction, in order to determine the non-specific reactivity of the skin of psychotic individuals. Histamine phosphate is said to be one of the physiologically active substances mediating an antigen-antibody reaction. It was, therefore, used to determine the ability of the skin to respond by whealing, should a specific antigen-antibody reaction occur. OT, which contains proteins, lipids and carbohydrates, and PPD, a protein substance, are known to be highly specific antigens of bacterial origin. They were used to determine the late skin reactivity to bacterial substances, particularly bacterial proteins. Coccidioidin is said to be highly specific. Since North Carolina is a non-endemic area, reactions to this crude fungus antigen should be of significance. The ascaris and trichinella antigens were chosen to determine the skin response to crude helminth derivatives (which are thought to contain proteins, fats and carbohydrates), and also to exclude non-specific cross reactions. A lecithin and acacia mixture was prepared to serve as a non-specific lipid substance containing a carbohydrate radical and of low irritability which would be slowly broken down to liberate a carbohydrate substance and which would serve as a late twenty-four hour control reaction. The role of lipids in skin tests is not known. Previous experiments with phosphatide produced chronic wheals in tuberculous individuals(3).

### *Methods*

Syringes and needles were prepared by immersing them in cleaning solution overnight and subsequently washing them in distilled water. They were sterilized in individual glass tubes in an autoclave. In no instance was a syringe or needle used for the injection of more than one antigen. The sites of injection were cleansed with sponges saturated with 70 per cent alcohol. Considerable difficulty was often encountered in obtaining the cooperation of the subjects, particularly those in the deeply psychotic group.

The reactions were read at twenty minutes and at twenty-four hours. The twenty-minute (or immediate) reactions were graded as follows:

0: a wheal which measured less than 0.5 cm. in diameter
±: a wheal which varied from 0.5 to 1.0 cm. in diameter
1+: a wheal varying from 1.0 to 1.5 cm. in diameter
2+: a wheal varying from 1.0 to 1.5 cm. in diameter with the presence of a pseudopod
3+: a wheal varying from 1.5 to 2.0 cm. in diameter with the presence of a pseudopod
4+: a wheal which was greater than 2.0 cm. in diameter with the presence of a pseudopod.

Since the erythema is considered to be due to a secondary local axon reflex and since its exact significance is not clear, it was not graded. All positive reactions did exhibit a proportional amount of surrounding erythema, however.

The twenty-four hour (or delayed) reactions were graded as follows:

0: no reaction
±: an indurated area less than 0.5 cm. in diameter
1+: induration varying from 0.5 to 1.0 cm. in diameter
2+: induration varying from 1.0 to 2.0 cm. in diameter
3+: induration greater than 2.0 cm. in diameter
4+: induration plus definite evidence of necrosis.

The erythema around the induration was not recorded.

With the helminth antigens both twenty-minute and twenty-four hour reactions were considered significant; with coccidioidin, PPD, OT, and lecithin and acacia, only twenty-four reactions were considered. Histamine and saline reactions were read at twenty minutes; a patient who reacted positively to saline was considered as possessing a hyper-reactive skin, and responses to other antigens were graded down proportionately to the degree of reaction to saline. All questionable (±) reactions were calculated as negative in the analysis.

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3. Harrell, G. T.: The Reaction in Humans to Phosphatide Fraction of Human Tubercle Bacilli, J. Clin. Investigation 23:943 (Nov.) 1944.

**Table 1**

**Skin Tests**

| | | Positive Reactions | | | | | |
|---|---|---|---|---|---|---|---|
| | | 20 Minutes | | 24 Hours | | Total | |
| | Tested | No. | Percent. | No. | Percent. | No. | Percent. |
| OT | 117 | — | — | 79 | 67.5 | 79 | 67.5 |
| PPD | 288 | — | — | 172 | 59.8 | 172 | 59.8 |
| Ascaris | 288 | 104 | 36.2 | 9 | 3.1 | 107* | 37.2 |
| Trichinella | 288 | 7 | 2.4 | 1 | 0.0 | 8 | 2.8 |
| Coccidioidin | 288 | — | — | 5 | 1.7 | 5 | 1.7 |
| Histamine (2+-4+) | 288 | 274 | 95.4 | — | — | 274 | 95.4 |
| Lecithin and acacia | 288 | 61 | 21.2 | 0 | 0 | 61 | 21.2 |
| Saline | 288 | 4 | 1.4 | — | — | 4 | 1.4 |

* Six patients gave reactions at both times.

**Table 2**

**Trichinella Skin Tests**

| | | | Positive Reactions* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean Duration of Institutionalization | | | | | | Total | |
| Phase of Psychosis | (Years) | Tested | 1+ | 2+ | 3+ | 4+ | No. | Percent. |
| Deeply psychotic (Group 1) | 7.5 | 147 | 3 | | | | 3 | 2.0 |
| Mildly psychotic (Group 2) | 10.9 | 91 | 1 | | | | 1 | 1.1 |
| Convalescent (Group 3) | 15.0 | 50 | 3 | | 1 | | 4 | 8.0 |
| **Total** | **11.1** | **288** | **7** | | **1** | | **8** | **2.8** |

* Both 20-minute and 24-hour reactions to trichinella antigen are considered positive.

## *Experimental Results*

### *Analysis of the results of trichinella skin tests* (table 2)

The incidence of positive reactions (2.8 per cent) was lower than that previously reported in various institutions (in tuberculosis sanatoria, 18.3 per cent; in psychiatric institutions, 18.4 per cent; in general hospitals, 6.9 per cent[4]). The present figure is identical with the incidence of infection in North Carolina which was demonstrated at autopsy by the muscle press and digestion methods[5]. There is no adequate explanation at present for this marked variation. Factors possibly involved have been discussed elsewhere[6]. It is known that the skin sensitivity to trichinella antigen is lost within five to seven years after infection[7]. It is possible that individuals in the present group may have lost their sensitivity during their period of institutionalization, since the shortest mean duration of stay for any group was seven and a half years. This explanation would presuppose the absence of clinical or subclinical epidemics of trichinosis in this institution during the past several years—in which case it would seem that the preparation of food at this institution must be superior to that in other institutions studied. If psychosis *per se* decreases skin reactivity to antigen, reactions to other antigens should also have been less than average. Such was not the case. In reviewing the records of previous skin tests performed at this institution, it was found that two of the inmates who previously gave a 1+ reaction now gave a negative and a questionable reaction respectively. The present lot of antigen may not be as potent as that used in the previous experiments, but this explanation does not seem likely.

The present results do not agree with the previous findings that the incidence of positive trichinella skin tests was four times as high in acutely psychotic patients as in convalescent individuals[4a]. Because of the small number in the series, however, no definite conclusions were warranted.

### *Analysis of the results of tuberculin tests* (tables 3 and 5)

The *incidence* of positive reactions to OT

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4. (a) Harrell, G. T. and Horne, S. F.: Trichinella Skin Tests in Tuberculosis Sanatoriums, Hospitals for Mental Diseases, and General Hospitals, Am. J. Trop. Med. 25:51-58 (Jan.) 1945; (b) Horne, S. F. and Harrell, G. T.: Trichinella Skin Tests in General Hospitals and Tuberculosis Sanatoria, Am. J. M. Sc. 207:759-765 (June) 1944.
5. Harrell, G. T. and Johnston, C.: The Incidence of Trichinosis in the Middle South, South. M. J. 32:1091-1094 (Nov.) 1939.
6. (a) Harrell, G. T., Horne, S. F., Aikawa, J. K., and Helsabeck, N. J.: Trichinella Skin Tests in an Orphanage and Prison, in press; (b) Avera, J. W., Yow, E. M., Harrell, G. T. and Fowler, E. B.: An Attempt by Feeding to Induce in Animals Reactivity to Trichinella Spiralis in the Absence of Infection, Am. J. Trop. Med. 26:125-131 (Jan.) 1946.
7. Gould, S. E.: Immunologic Reactions in Subclinical Trichinosis, Am. J. Hyg. 37:1-18 (Jan.) 1943.

### Table 3
### Tuberculin Skin Tests
### Incidence of 24-Hour Reactions

| | | *Old Tuberculin* | | | *Purified Protein Derivative* | | |
|---|---|---|---|---|---|---|---|
| *Phase of Psychosis* | *Mean Duration of Institutionalization (Years)* | *No. Tested* | *No. Positive* | *Percent. Positive* | *No. Tested* | *No. Positive* | *Percent. Positive* |
| Deeply psychotic | 7.5 | 0 | 0 | 0 | 147 | 72 | 49.0 |
| Mildly psychotic | 10.9 | 67 | 33 | 49.0 | 91 | 59 | 64.8 |
| Convalescent | 15.0 | 50 | 46 | 92.0 | 50 | 41 | 82.0 |
| **Total** | **11.1** | **117** | **79** | **67.5** | **288** | **172** | **59.8** |

### Table 4
### Ascaris Skin Tests
### Incidence of Positive Reactions

| | | | *Positive Reactions* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | *20 Minutes* | | *24 Hours* | | *Total* | |
| *Phase of Psychosis* | *Mean Duration of Institutionalization (Years)* | *No. Tested* | *No.* | *Percent* | *No.* | *Percent.* | *No.* | *Percent.* |
| Deeply psychotic | 7.5 | 147 | 68 | 46.2 | 4 | 2.7 | 70* | 47.6 |
| Mildly psychotic | 10.9 | 91 | 21 | 23.1 | 2 | 2.2 | 21* | 23.1 |
| Convalescent | 15.0 | 50 | 15 | 30.0 | 3 | 6.0 | 16* | 32.0 |
| **Total** | **11.1** | **288** | **104** | **36.2** | **9** | **3.1** | **107** | **37.2** |

* Two patients in this group had positive reactions at 20 minutes and 24 hours.

### Table 5
### Tuberculin and Ascaris Skin Tests
### Magnitude of Reactions

| | *Old Tuberculin* | | | *Purified Protein Derivative* | | | *Ascaris* | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1-2+ | 3-4+ | 3-4+ | 1-2+ | 3-4+ | 3-4+ | 1-2+ | 3-4+ | 3-4+ |
| *Phase of Psychosis* | *No.* | *No.* | *Percent.* | *No.* | *No.* | *Percent.* | *No.* | *No.* | *Percent.* |
| Deeply psychotic | | | | 58 | 14 | 19.5 | 58 | 12 | 17.3 |
| Mildly psychotic | 33 | 0 | 0 | 40 | 19 | 32.2 | 21 | 0 | 0 |
| Convalescent | 45 | 1 | 2.2 | 33 | 8 | 19.5 | 14 | 2 | 12.5 |
| **Total** | **78** | **1** | **1.3** | **131** | **41** | **23.8** | **93** | **14** | **13.2** |

and PPD increased significantly with the increase in the severity of the psychosis, and with the increase in the duration of institutionalization (table 3). The *magnitude* of the positive reactions to both antigens bore no relation to the severity of the psychosis (table 5). The difference in incidence of positive reactions to OT and PPD was not considered significant. The amount of PPD given (0.005 mg.) is equivalent to roughly ten times the amount of OT used (0.1 mg.), so that the higher incidence of 3- and 4-plus reactions with PPD would be expected.

Deegan, Culp, and Beck(8) reported 86.6 per cent positive reactions to OT in 3,317 psychiatric patients; Altshuler and Bailey(9), 88 per cent among 2,410 patients. In neither study was any correlation found between the type of psychosis and the incidence of positive reactions. It was concluded that the duration of stay in a tuberculous environment, and not the type of psychosis, seemed to be the dominating epidemiologic factor. Our findings are consistent with the above interpretations. The patients in our study were classified according to the severity of the psychosis instead of the type, but the deeply psychotic individuals who showed the lowest incidence of positive reactions were also the ones who had been institutionalized the shortest period of time.

### *Analysis of the reactions to ascaris antigen* (tables 4 and 5)

The incidence of positive reactions to ascaris antigen was greater in the more severely psychotic patients—a finding which is in contrast to the results with OT and PPD (tables 3 and 5). This finding can be explained as being due to the poorer hygiene and sanitation in the deeply psychotic group, and probably is not a manifestation of al-

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8. Deegan, J. K., Culp, J. E. and Beck, F.: Epidemiology of Tuberculosis in a Mental Hospital, Am. J. Pub. Health 32:345-351 (April) 1942.
9. Altshuler, S. S. and Bailey, L. J.: Control of Tuberculosis in an Institution for Mentally Ill, Am. Rev. Tuberc. 44: 335-345 (Sept.) 1941.

**Table 6**
**Coccidioidin Skin Tests**

| *Phase of Psychosis* | *Mean Duration of Institutionalization (Years)* | *No. Tested* | *No. Negative* | *No. Positive* | *Percent. Positive* |
|---|---|---|---|---|---|
| Deeply psychotic | 7.5 | 147 | 146 | 1 | .07 |
| Mildly psychotic | 10.9 | 91 | 89 | 2 | 2.2 |
| Convalescent | 15.0 | 50 | 48 | 2 | 4.0 |
| **Total** | **11.1** | **288** | **283** | **5** | **1.7** |

tered skin response due to psychosis itself. The total percentage of positive reactions in the three groups (37.2 per cent) is approximately six times greater than the incidence of infection with Ascaris (6.5 per cent) which was found in 37,346 stool examinations in the same area of the state from which these patients came(10). A positive skin test, however, does not necessarily indicate active infection. It is not known how long the skin reaction remains positive after the infection subsides. The adult worms are said to remain viable in the intestines a year or longer. The higher incidence of 3- and 4-plus reactions in the deeply psychotic group is compatible with the greater exposure to ova in this group (table 5). The minimally positive skin tests may be due to residual skin sensitization from past infections.

### *Analysis of the reactions to coccidioidin* (table 6)

Coccidioidin is thought to be a specific antigen. One would, therefore, not expect any positive reactions in residents of a non-endemic area. Five out of the 288 individuals tested, however, unexpectedly showed 1-plus reactions to coccidioidin (table 6). None of the 5 had traveled or lived beyond the eastern half of North Carolina. Three of them had positive tuberculin reactions. The other 2 gave negative reactions to OT and PPD; one of these patients was classified as deeply psychotic and the other as mildly psychotic. In the latter patient a roentgenogram of the chest revealed no abnormalities. In the deeply psychotic individual, a diffuse homogeneous increase in density which involved the entire right lung was found, and was interpreted as being due to slight adhesion or pleural thickening.

It is possible that pulmonary lesions, in the absence of a positive tuberculin reaction, may be indicative of pulmonary coccidioidomycosis. There is some evidence that positive coccidioidin reactions may be obtained in individuals who have not been in endemic areas. Aronson and Gallagher(11) found that 17 out of 680 students in an Eastern preparatory school reacted positively to coccidioidin. Of these 17, 8 had never been west of the Mississippi River. Twelve reacted negatively to 0.01 mg. of OT; in 5 of these, roentgenologic examination revealed calcified nodules in the hilar regions of the chest. Either the coccidioidin reaction is not absolutely specific, or else there may be sporadic subclinical infections of coccidioidomycosis in non-endemic areas.

### *Analysis of the reactions to histamine* (table 7)

Of all individuals tested, 95.4 per cent revealed at least a 1-plus reaction to histamine. However, a 1-plus reaction is probably normal and of no significance. If all reactions without pseudopods (less than 2 plus) are considered insignificant, approximately 50 per cent of the individuals in each of the three groups reacted positively. Psychosis of varying severity apparently makes no difference in the ability of the blood vessels to respond to histamine stimulation. It is not known whether the 50 per cent incidence of significant reactions is abnormally high, since there is no adequate study on non-psychotic individuals.

### *Analysis of the reactions to saline*

Of the 288 individuals tested, 4, all of whom were deeply psychotic, showed a 1-plus immediate reaction. All other immediate and delayed readings were negative. The results were interpreted as indicating that the reactivity of the skin is not increased in psychotic patients.

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10. Keller, A. E., Leathers, W. S. and Knox, J. C.: The Incidence and Distribution of Ascaris Lumbricoides, Trichocephalis Trichiura, Hymenolepis Nana, Enterobius Vermicularis, and Hymenolepis Diminuta in Seventy Counties in North Carolina, Am. J. Hyg. 27:258-274 (March) 1938.

11. Aronson, J. D. and Gallagher, J. R.: Sensitivity to Coccidioidin among Boys in an Eastern Preparatory School, Am. J. Pub. Health 32:636-639 (June) 1942.

**Table 7**
**Histamine Skin Tests**
**20-Minute Reactions**

| | | | *Positive Reactions* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1+ | 2+ | 3+ | 2-3+ | *Total* | |
| *Phase of Psychosis* | *No. Tested* | *No. Negative* | *No.* | *No.* | *No.* | *Percent.* | *No.* | *Percent.* |
| Deeply psychotic | 147 | 9 | 75 | 52 | 11 | 42.8 | 138 | 93.9 |
| Mildly psychotic | 91 | 3 | 40 | 39 | 9 | 52.8 | 88 | 96.7 |
| Convalescent | 50 | 2 | 24 | 17 | 7 | 48.0 | 48 | 96.0 |
| **Total** | **288** | **14** | **139** | **108** | **27** | **46.9** | **274** | **95.4** |

### *Analysis of the reactions to lecithin and acacia*

No positive reactions were obtained.

### *Discussion*

The skin response to the intradermal injection of physiologic saline in these patients was similar to that in non-psychotic individuals. The slight hyper-reactivity noted in 4 of the deeply psychotic patients was contrary to expectation, but was not considered significant.

The skin response to histamine is due to local capillary dilatation at the site of injection, increased capillary permeability, and transudation of fluid, with the formation of a wheal. Any antigen-antibody reaction is thought to result in increased cellular permeability and liberation of physiologically active substances, among which histamine is considered most active. Since the skin response to histamine did not vary with the stage of psychosis, it appears that, in all stages of psychosis, the skin retains its capacity to respond to histamine; this response results in the immediate antigen-antibody reaction. Such being the case, one would not expect psychosis *per se* to produce any alteration in response to a specific antigen-antibody reaction.

The twenty-four hour or delayed reaction differs from the immediate reaction in being a cellular response rather than merely a transudation of fluid. The exact significance of these two types of skin responses is not known at present. There is some indication, however, that the type of response is governed by the rate of absorption of the injected material. Freely soluble substances such as carbohydrates cause an immediate reaction; less soluble substances such as proteins and phospholipids may cause a delayed response. Lecithin and acacia were used to determine whether the skin of psychotic individuals would react at twenty-four hours to a non-specific substance which was slowly absorbed. Since no positive reactions to the substances were obtained in any of the three groups, it appears that there is no increase in reactivity of the skin of psychotic patients. From the results of this study, one could not conclude that there was not a suppression of skin response to some test substances.

The responses of the three groups to the specific antigens can be adequately explained without postulating an alteration in skin reactivity with psychosis itself or with variations in the severity of the psychosis. The low incidence of positive trichinella skin tests may be due to loss of sensitivity during the period of institutionalization, in the absence of reinfections. The variations in the incidence of reactions to OT and PPD may be due to differences in the duration of residence in the tuberculous environment of an institution. The differences in the incidence of reactions to ascaris antigen are probably due to variations in exposure in the three groups and possibly to loss or decrease of skin sensitivity during the period of institutionalization. The unexpected finding of some reactions to coccidioidin indicates the possibility of the existence of subclinical cases of coccidioidomycosis in non-endemic areas, or the non-specificity of coccidioidin.

From the results of the present study, it would appear that the antigen-antibody reaction in psychotic patients, as measured by the skin test, does not differ from that in normal individuals. The reaction does not appear to be under neurogenic control, since the severity of the psychosis caused no significant differences in skin responses. Had the degree of erythema been recorded, alterations in the local axon reflex due to autonomic control might have been detected. It is not known whether the local axon reflex is affected in the presence of general autonomic imbalance, but it has been shown by tests of electrical resistance that there is suppression of general autonomic activity with severe psychosis. Electrical resistance of the skin is a measure of the degree of sweating, which is under autonomic control. It consequently need have no relationship to the skin response to biologic products.

### *Summary*

1. In order to determine whether psychosis produces an alteration in skin response, 288 white female patients in a psychiatric institution were skin-tested with saline, histamine, lecithin and acacia, trichinella and ascaris antigens, OT, PPD, and coccidioidin.
2. The incidence of positive trichinella skin tests (2.8 per cent) was lower than in previous investigations. The possibility that skin sensitivity is lost during prolonged institutionalization, in the absence of re-infection, is suggested.
3. The incidence of positive reactions to OT (67.5 per cent) and to PPD (59.5 per cent) is comparable to the results obtained by other investigators. The variation in the incidence of reactions to tuberculin among the three groups may be dependent upon the duration of exposure in a tuberculous environment.
4. The positive reaction to ascaris antigen noted in 32.2 per cent of the patients is merely an indication of present or past infection. The higher incidence of reactions in the deeply psychotic group is probably a reflection of poor sanitation and hygiene in this group.
5. The finding, in a non-endemic area, of positive coccidioidin reactions in 1.7 per cent of the individuals tested, none of whom have been out of the area, suggests the possibility of sporadic subclinical infections with coccidioidomycosis, or of the nonspecificity of the reaction.
6. No significant abnormal reactions to saline, histamine, or lecithin and acacia were found.
7. The skin response to specific and nonspecific substances was not found to be abnormal in individuals with psychosis of varying degrees of severity. The variations in the incidences of positive reactions among the three groups studied could be adequately explained without postulating that the variation in skin response was dependent on the severity of the psychosis.

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# THE TREATMENT OF INTERTROCHANTERIC FRACTURES BY THE SMITH-PETERSEN NAIL

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The treatment of a fracture of the neck of the femur in the aged and feeble usually presents serious problems. An intertrochanteric fracture presents additional problems.

There are, of course, a number of acceptable ways of treating fractures of the femur where the neck and trochanter are involved. For a long time, we have been treating most of these intertrochanteric fractures by inserting a Smith-Petersen nail and applying an angle bar held to the femur by screws. This method has given uniformly good results.

### *Disadvantages of Treatment by Traction or Casts*

The use of traction where the patient's skin is sensitive and the blood supply very much reduced is almost out of the question in many cases. The use of skeletal traction is usually not satisfactory. A plaster spica to hold the hips and the legs in position must usually extend up to the chest. It frightens and discourages patients, and gives them a sense of confinement and often actual pain. Many patients become panic-stricken at the thought of spending long weeks in a plaster splint of this kind, having to be moved about in bed, and not being able to sit up in a comfortable position.

### *Advantages of Treatment with the Smith-Petersen Nail*

The insertion of a Smith-Petersen nail with an angle bar will hold the bone in position and permit the patient to sit up in bed. Many can get up in a wheel chair the next day. The relief from pain and the ability to sit up help the patient's morale and have a great bearing upon his recovery. Pain itself produces shock, and the pain after an oper-

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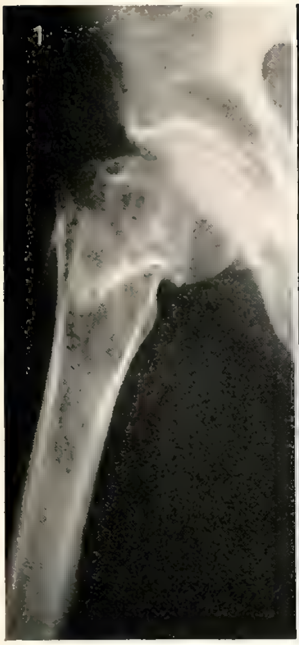
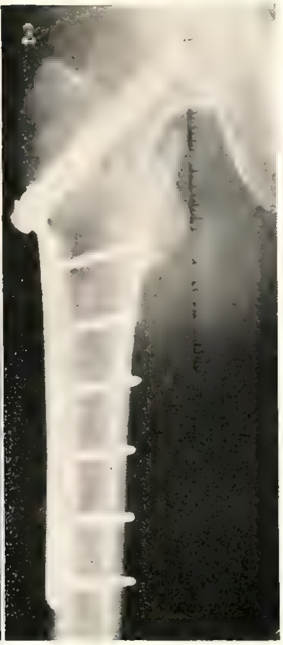
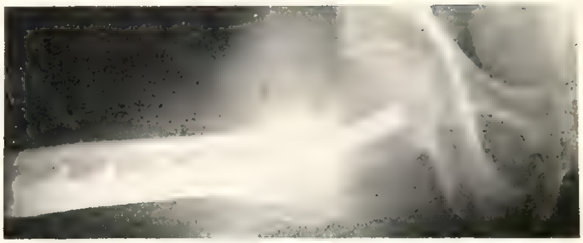
From the Davis Hospital, Statesville, North Carolina.







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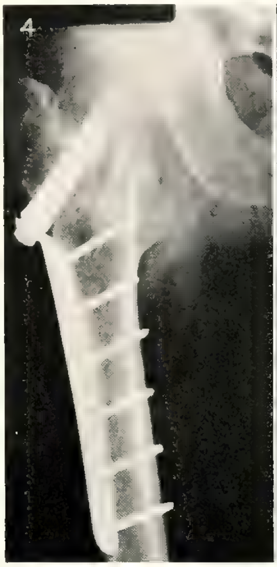

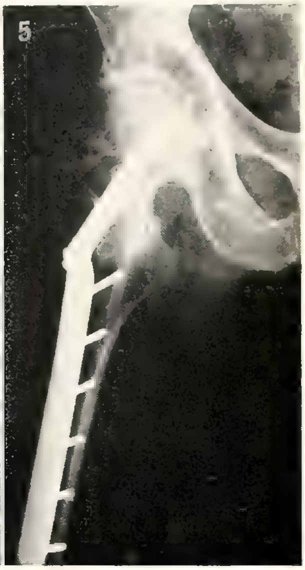

**Fig. 1. Complete intertrochanteric fracture of the right hip, with slight abduction of the proximal head and neck. Fig. 2 and 3. Antero-posterior and oblique views following insertion of a Smith-Petersen nail and application of the angle bar held in place by bone screws. The fragments appear to be in satisfactory position. Fig. 4. A re-examination ten weeks following injury shows that healing is taking place, although the cleavage line is still present. Fig. 5. A film after four months shows the fracture almost completely healed. Note that there has been no bone absorption around the nail or bone screws.**

ation of this kind is fortunately far less than one would expect. Fixation of the fragments stops the most severe and distressing pain. Furthermore, the outlook of a patient who is able to be up in a wheel chair is far different from that of a person who is bedridden and has nothing to take his mind off his suffering.

Another factor to be considered is the tremendous burden of care which falls upon the family of a bedridden patient. If we can enable these patients to recover at least sufficiently to get in and out of bed by themselves, so that they do not require constant nursing, we have performed a great service for both the patient and his family. A final advantage of the Smith-Petersen nail is that patients can leave the hospital in a very short while after the operation. Thus the financial burden upon the patient and his family is reduced, and the hospital's nursing load is lightened.

### *Selection of Cases*

All patients with intertrochanteric fractures, most of whom are rather feeble and are not good risks for surgery of any kind, must be examined carefully in order to determine not only the nature of the injury but also whether or not their physical condition is such that a surgical procedure can be undertaken. We have had some patients whose general condition was so poor that we have hesitated to do anything. Since there is so little shock associated with the operation, however, and since it offers some hope and relief from pain, we believe it to be the safest procedure in nearly all cases. In a number of cases where the decision to operate was made with some misgivings, we have been agreeably surprised at the results. We have had two 95-year-old patients with severe and extensive intertrochanteric fractures, both of whom recovered.

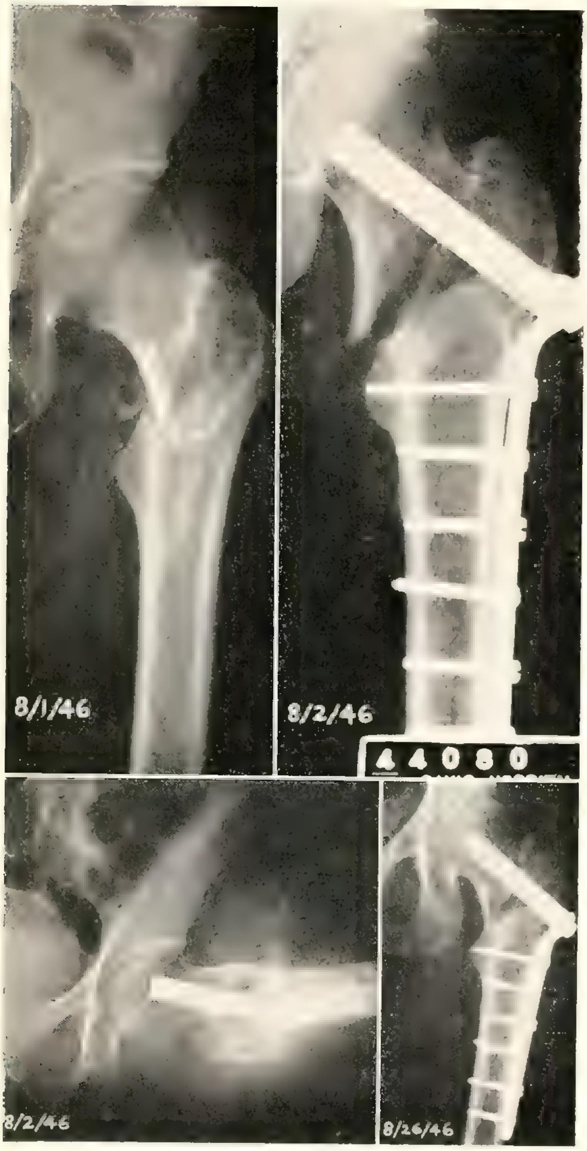

**Fig. 6. A second series of films shows an intertrochanteric fracture very similar to the first, but with slightly more comminution. Note the good position of the fragments and the absence of bone absorption.**

Patients who appear to be almost moribund should of course be treated for shock before any operative procedure is considered. Sometimes such patients respond so well to treatment that operation can be performed the next day.

### *Method*

Where an experienced roentgenologist and an experienced surgical team with all the necessary equipment and instruments are available, the operation can be done under low spinal anesthesia very rapidly and with very little shock. It should not be undertaken without trained personnel and the proper equipment.

The length of the Smith-Petersen nail should depend upon the length of the neck of the femur, and the nail should be applied and driven in to exactly the proper depth. The angle bar should have the proper angle and should be held by screws just long enough to come through the surface of the bone on the opposite side. A simple measuring device can be used to determine the length of screw which is needed.

It is important that the patient receive every possible care and attention both before and after the operation. A cheerful atmosphere and some encouragement help the patient's mental attitude. He should be moved about in bed and allowed to be up in a wheel chair as soon as possible—in many cases, the day after the operation. Appetizing and nourishing food, stimulants, vitamins, mild hypnotics, and analgesics are all helpful and important parts of the treatment.

### *Possible Complications*

One would expect that the use of such a large amount of metal in a fracture might cause trouble. Where S. M. O. metal is used throughout the Smith-Petersen nails, the angle bar, and the screws, however, there seems to be very little tissue reaction. It is rarely ever necessary to remove an angle bar and nail before healing has taken place. We have left these for long periods of time without any apparent trouble. There is no electrolytic reaction affecting the bone as was the case with the original steel Lane and Sherman plates with steel screws of the same metal. Very often the screws from this metal would come loose as a result of the absorption of the bone around and about the screws. In case healing had not taken place, the results were sometimes disastrous, especially if any undue strain were put upon the site of fracture before good union had occurred.

Not all patients with intertrochanteric fractures make a good recovery following the insertion of a Smith-Petersen nail. Occasionally there is absorption of the cancellous tissue of the neck of the femur. The vitality ply so poor that union cannot be obtained of the bone may be so low and the blood supunder any circumstances. Even though these complications should develop, however, this method of treatment tides the patient over the emergency by fixing the fragments and stopping the extreme pain, which, I believe, is responsible for many of the deaths which follow fractures of the femur in aged and feeble patients.

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## Maternal Welfare Section*

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### CASE REPORTS FROM THE MATERNAL WELFARE RECORDS

### RUPTURE OF THE UTERUS

One year ago the Maternal Welfare Committee began a study of maternal deaths occurring within the state of North Carolina. The purpose of the study was to learn the actual facts associated with each death, so that the collected information could be used as a guide toward improving our maternal death rate. Through the careful review of a patient's course and treatment during her final illness it is usually possible to determine whether the death was preventable or nonpreventable. The factors responsible for a preventable death can be clearly recognized in going over the record of the case.

Many of the case records are of unusual interest. Each of them contains practical lessons in the field of obstetrics and clearly demonstrates the problems which exist throughout the South as well as in North Carolina. The Maternal Welfare Committee is now ready to present these interesting records to the members of the North Carolina profession, so that we all may share the valuable information contained therein. The case records below and those which will subsequently be published in this section of the JOURNAL are selected either because they demonstrate obstetric complications which recur frequently as causes of maternal deaths or because they are of unusual interest. Many of them also demonstrate errors in management which appear too frequently in the files of the Maternal Welfare Committee.

Rupture of the uterus is a rather common cause of deaths associated with pregnancy. Often the presence of this complication is not recognized and the cause of death is listed as hemorrhage or shock or both. Three common etiologic factors appear in the records of the committee and in the literature. Cesarean section leaves a scar in the uterine wall, which may rupture during a subsequent pregnancy or labor. Traumatic rupture of the uterus often occurs when instrumentation is employed in an attempt to produce an abortion. Rupture of the lower uterine segment frequently results from operative obstetric procedures, and particularly when the method of internal podalic version and extraction is used to solve a complication of labor. The use of pituitrin in the conduct of labor is hazardous, and rupture of a normal uterus may follow the smallest injection of the drug.

The following case histories from the records of the Maternal Welfare Committee illustrate two of the numerous types of uterine rupture represented in the Committee's files.

#### *Case 1—N.C.M.W.C. 46 C 16*

The patient, an obese, 28-year-old colored woman, had been delivered of a living child by a classical cesarean section thirteen months prior to her death. The cesarean operation was performed because of a severe toxemia of pregnancy. Her blood pressure had never returned to normal, and when she was admitted to the hospital in the seventh month of her second pregnancy her blood pressure was 190 systolic, 100 diastolic. Her urine showed a 1-plus reaction for albumin, but there was no evidence of cardiac failure. Her weight was 260 pounds. She was kept in the hospital a short time on bed rest and a low-salt diet with adequate protein, without a change in her condition. The decision of her attendant was to follow her further in pregnancy as an outpatient.

She was again admitted to the hospital at term about twenty-four hours after the onset of labor. Her blood pressure ranged from 190 to 210 systolic and from 130 to 140 diastolic. Her urinary output was adequate, and the urine contained albumin (1 plus). No evidence of cardiac failure was observed. She was permitted to stay up, and walked about the hospital constantly.

The patient continued to have mild pains for five days (one hundred and twenty hours). At the end of seventy-two hours she complained of pain in her abdomen, and marked tenderness over the abdomen was noted. Near the end of her labor absence of the fetal heart sounds was observed. Progressive dilatation of the cervix occurred, and when the cervix was fully dilated the patient was given a spinal anesthetic, and the child was delivered by craniotomy. The patient's condition appeared fairly satisfactory, but the pulse rate increased from 90 to 110. The placenta could not be expressed, and after twenty minutes the attendant explored the uterine cavity and found a defect in the uterine wall, through which the omentum and intestines were palpable.

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*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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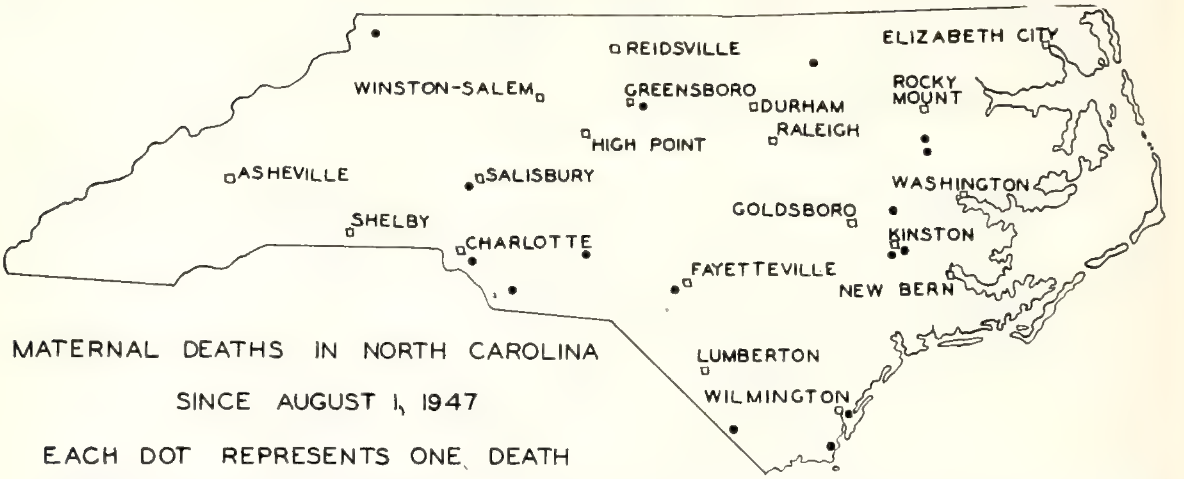

MATERNAL DEATHS IN NORTH CAROLINA

SINCE AUGUST 1, 1947

EACH DOT REPRESENTS ONE DEATH

Transfusions of whole blood and plasma in an unknown quantity were given to combat the profound shock which rapidly appeared. The patient was prepared for operation, and a hysterectomy was performed under ether anesthesia, but she expired before the procedure was completed, two and a half hours after delivery.

At operation a rupture of the scar of the previous cesarean section was found, resulting in a linear defect along the anterior wall of the uterus. In addition, a fresh laceration extended from the lower margin of this scar across the lower uterine segment to the right and into the broad ligament through the major uterine vessels.

### *Discussion*

In discussing the case the Maternal Welfare Committee recognized five major errors in management which contributed to the loss of the patient's life. The incidence of rupture of the uterus in patients who have had a previous cesarean section is very high. Any such patient should be kept under constant observation if labor is to be permitted, and all preparations should be made for immediate operative intervention at the first sign of an abnormality in the course of her labor. Further, it is recognized that rupture of the uterus often occurs before the advent of labor. Beacham and Varino(1) and Black(2) have clearly shown the frequency with which rupture of a cesarean section scar occurs without classical symptoms or signs to indicate that this serious complication has taken place. Cases are described in which shock and external hemorrhage were not observed at the time rupture of the uterus occurred.

1. The decision to continue expectant treatment in the presence of severe hypertension at the seventh month was questioned by the committee. The extreme hypertension which developed during the last two months greatly increased the risk of any obstetric procedure.

2. No specific plan was made in anticipation of the serious complication which developed. Had the possibility of this complication been considered seriously, an early diagnosis of uterine rupture would have been made when the suggestive evidence of a prolonged and abnormal labor was present in addition to the clinical findings of diffuse abdominal pain, tenderness over the abdomen, and disappearance of the fetal heart sounds. Slow progress of labor and occasionally spontaneous delivery of the child may occur after uterine rupture, when the defect is in an avascular portion of the uterus or scar and when the child is not extruded into the peritoneal cavity.

3. The selection of a traumatic operative method of vaginal delivery when a complication of labor developed in a patient who had a previous cesarean section represented an error in obstetric judgment secondary to an error in diagnosis. In general, it may be said that repeat cesarean section is the method of choice if an *operative* delivery must be used under these circumstances.

4. The use of spinal anesthesia for delivery in a patient with extreme hypertension is invariably dangerous. Sudden death often follows the administration of a spinal anesthetic under these circumstances, and lower tolerance to blood loss and to trauma is to be expected.

5. Proper preparation for the management of a patient with the dangerous combination of lesions which this patient had (previous classical cesarean section and severe hypertension) includes obtaining compatible blood

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1. Beacham, W. D., and Varino, G. A.: The Management of Rupture of the Uterus near, at, or past Term. Clinics 1: 125-143 (June) 1942.
2. Black, W. T., Jr.: Rupture of the Uterus, South. M. J. 36:510-515 (July) 1943.

in adequate amounts and having it readily available for administration. This was not done, and a delay in the administration of whole blood transfusions resulted.

### *Case 2—N.C.M.W. 47 W 85*

A non-preventable death and very unusual case of uterine rupture is illustrated by the following report:

The patient was a white, 22-year-old woman who had one living child delivered normally by the vaginal route. Throughout her second pregnancy all findings, including blood pressure determinations, urinalyses, and Kahn test, were normal. When she reached term, she took a dose of castor oil of her own volition before retiring. About four hours later her mother found her unconscious on the bathroom floor. The patient revived, and complained of abdominal pain. She was referred directly to the hospital by her physician. When she was admitted, about one hour after the initial attack of fainting, she appeared to be moribund, and her pulse and blood pressure were unobtainable. Intravenous plasma was administered while a search for compatible whole blood was made and while the operating room was being prepared. The patient expired approximately forty-five minutes after arriving at the hospital, however. The abdomen was opened in an attempt to save the child, and was found to be filled with blood. A 9½ pound stillborn baby was extracted from the uterus.

An examination of the uterus revealed a small defect in the posterior uterine wall, a little to the left of the midline, involving a large uterine sinus which lay open for a distance of ½-¾ inch. There was no apparent pathologic process present at the site of the rupture, and no significant history could be obtained to explain this bizarre catastrophe.

### *Discussion*

The committee unanimously agreed that this death was non-preventable. Rupture of the normal uterus rarely occurs without a precipitating cause. In this case, however, there was no question of possible trauma or of any of the usual etiologic factors. Other case reports in the literature usually describe adenomyosis or other uterine pathology at the site of rupture. Although no microscopic examination was made in this case, no gross pathology was observed in the uterine wall.

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**Science news for the public.**—What is the public entitled to, and what is it not entitled to, in the way of science news? It is not entitled to sensational, uncritical, and often partisan reports on results or conclusions which have not yet run the normal gamut of scientific testing. The validity of research findings should not be argued before the public as jury. The mass audience of magazine or newspaper, movie or radio, does not have, and cannot possibly have, the knowledge which entitles it to make a judgment—nor do the writers or producers, except in rare cases where they have themselves had extensive experience as active scientists. Only the collective and slowly accruing labors of the actual workers in a field can render a useful decision.—R. W. Gerard: Science and the Public, Science 106:23 (July 11) 1947.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

DURHAM

## OBSTETRICS AND GYNECOLOGY IN AMERICA

## IX

## THOMAS ADDIS EMMET, 1828-1919

One of the founders of modern gynecology, Thomas Addis Emmet, was the descendant of a long line of eminent physicians who were equally versed in law and literature. His grandfather, Thomas Addis Emmet, a graduate of Edinburgh, attained early prominence as a physician in Dublin. He and his wife spent several years in prison in Fort George, Scotland, as a result of the part he played in the Irish Revolutionary Movement of 1798. His illustrious brother, Robert Emmet, paid with his life for his participation in this rebellion. The elder Emmet later settled in New York City, and became Attorney General for the State of New York in 1812. His son, John Patton Emmet, attended West Point as a cadet. A brilliant student, he was appointed acting assistant professor of mathematics in the Academy, a position he filled while studying medicine with Dr. William J. McNeven. In 1827 Thomas Jefferson appointed him to the chair of chemistry and materia medica at the University of Virginia. In the same year Emmet married Mary Boyd Farley Tucker, the niece of a colleague on the University faculty, and purchased a tract of land adjoining the University grounds. Here he built his home, Morea, and lived in great tranquillity, dividing his time between his work at the University and his extensive horticultural studies and experiments.

Thomas Addis Emmet, the fourth son of the name and the one with whom we are chiefly concerned, was born in 1828. Scholarship came late to the young Emmet. He was of an inquiring mind, but rebelled against discipline and often played truant to roam the fields with his dog and gun. On the advice of his grandfather in New York, he was sent to St. Thomas' Hall, a large preparatory school near Flushing, New York. Here he made many friendships which continued through his lifetime.

When Emmet was 14 his father died, and he and his mother returned to Virginia. Here, in the library of his uncle, Mr. George Tucker, professor of political economy and belles-lettres at the University of Virginia, he spent many hours reading on various subjects. He entered the University of Virginia as a student, but his preparatory schooling had been so poor that he soon lost interest in his studies and was requested to leave. On a sudden impulse he visited Robley Dunglison, a former friend of his father's, at the Jefferson Medical School in Philadelphia. This visit proved to be a turning point of his life. He was admitted to the college as a medical student and, excelling in his work there, received his diploma in 1850.

Emmet recognized the deficiencies of his training, and instead of entering general practice he wisely spent the next three years as resident physician at the Emigrant Refugee Hospital on Ward's Island. Here he had charge of 11,000 miscellaneous cases and received the splendid basic training which equipped him for what proved to be his life's work; in addition to gaining a wide knowledge of diseases, he learned the proper value of keeping accurate case records.

1885 was a historic year in Emmet's life. In this year, through political changes, he lost his position at the Emigrant Refugee Hospital and he made the acquaintance of the renowned James Marion Sims. Dr. Sims had recently opened the Woman's Hospital at 83 Madison Avenue, and although the constitution of the hospital distinctly stated that "the surgeon's assistant must be a woman," we find Emmet officially recognized in that position in the Annual Report of 1857.

The proviso regarding the surgeon's assistant was but one of the many rules circumvented by the restless genius Sims, who was notoriously intolerant of restraint. The orderly regime of a hospital irritated him; case histories and records were his *bete noir*. He promptly recognized in Emmet the qualities he needed in an assistant, particularly the capacity for methodical work. It may be said that when Sims found Emmet, Emmet found himself. Like Sims, he had genius; but it was the genius of the brilliant student and consisted of patient persistence, the constant exercise of a predominantly analytical mind, calm judgment, and a painstaking attention to details. The two surgeons—methodical, deliberate Emmet and dynamic, restless Sims—complemented each other with the most brilliant results.

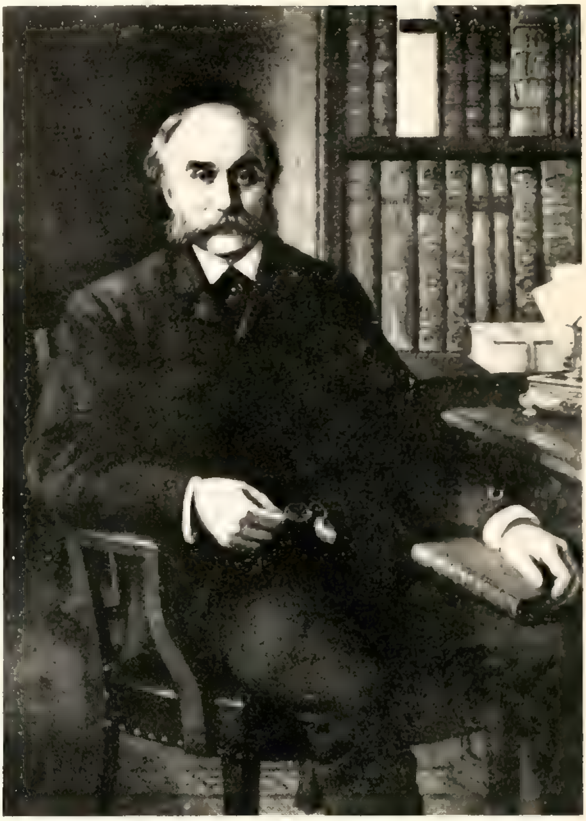

Fig. 1. Thomas Addis Emmet, 1828-1919.

Emmet personally kept careful and accurate histories of every case and illustrated the pathologic conditions and operations with pen-and-ink drawings, sometimes coloring them with tobacco juice or other pigments. These history books of ninety-two years ago are now on display in the library at the Woman's Hospital. The errant Sims came and went, but Emmet was always to be found at the hospital, operating, recording, analyzing, and demonstrating to eager postgraduates his operative technique for vesico-vaginal fistula. In connection with the latter ailment, Emmet once wrote:

> "I did not realize that it was to be part of my life's mission to render this loathsome and almost incurable injury not only curable but that I was to be the means of restoring to perfect health nearly six hundred women thus afflicted and finally to discover the cause and thereby revolutionize the obstetrical practice of the world, so that now the occurrence of the injury is almost unknown."

In 1861 Sims departed for Europe, where he remained until 1868, and Emmet was made Surgeon-in-Chief. The Board of Lady Managers, according to Emmet, were "demoralized" by Sims's departure and considered the advisability of closing the hospital. The patients, taking the cue, began to leave the hospital in the manner ascribed to certain inhabitants of sinking ships. To keep the Woman's Hospital open, Emmet transferred operative cases from his own private hospital at great pecuniary loss to himself.

During the Civil War, Emmet was under the constant surveillance of secret service authorities because of his Southern sympathies. Unlike Sims, however, he remained aloof from the struggle, devoting himself to his work and to planning and helping to organize the Wetmore Pavilion of the Woman's Hospital. For many years, as Surgeon-in-Chief of the only special hospital for women in the world, Emmet utilized his unparalleled opportunities with the superb craftsmanship and industry which were characteristic of the man. The knowledge and skill with which he made the tissues of the vagina and cervix do what he willed were possessed by no other doctor to a like degree. In his fistula operations at the Woman's Hospital he sat at a simple table in a small room, sometimes for hours, his nurse beside him holding the Sims speculum, the patient in the semi-prone position, while visiting students and doctors sought glimpses of the operation in progress. The early operations were perfomed without anesthetic and, when operating, Emmet often grew testy and complained bitterly of the awkwardness of his assistants, all the while advancing slowly and with painstaking care toward his goal.

The list of operations perfected and new operative principles laid down by Emmet is indeed impressive. With the exception of laparotomy, which he eschewed, he covered the whole range of gynecologic surgery. In 1868 he opened the bladder to secure drainage in a case of chronic cystitis; he was the first to advocate this procedure as applied to women. His textbook on vesico-vaginal fistula, an exhaustive treatise on the subject, appeared in the same year; in it he perfectly described the first case illustrating his procedure of flap-splitting. Earlier, in 1865, he had modified Sims's operation on the anterior vaginal wall by carrying the denudation in front of the cervix, thus perfecting the entire procedure. In 1874 he presented to the medical profession his operation for the repair of laceration of the cervix and described the symptoms arising from this condition. It may thus be seen that he invented the operation of trachelorrhaphy, which has played so great a part in the evolution of gynecology as a surgical specialty. Emmet's "The Principles and Practices of Gynecology," which appeared in 1879, was the first thoroughly scientific book on the subject in English. The condensed record of his wide personal experience, this textbook went through three English and American editions and added enormous prestige to its author's name.

Late in life Emmet turned over his valuable Madison Avenue properties so that a skyscraper could be erected on the site, stipulating that he have a suite for life in the top story. In that lofty perch he lived apart, though not wholly separate, from the city life, once more in sight of the North and East Rivers, which he had looked upon with unobstructed vision when calling on Marion Sims at the start of his career. In his apartment he was a recluse in the midst of millions, cut off from visitors by deafness, bowed by age and the effects of an old injury. He died on the first of March, 1919, when nearing his ninety-first birthday.

Though a later day has changed all that Sims and Emmet held sacred in surgery and has silenced their shibboleths, yet in the history of gynecology they abide, serene and undimmed, like the twin stars Castor and Pollux in the midnight sky, well-known and welcome beacon lights destined to shine long after thousands of later and lesser luminaries have paled into oblivion.

JAMES PRATT MARR, M.D.
New York City, New York.

**Where the stream divides.**—In a sense we are now standing where the stream divides. For generations we have followed the branch of infectious diseases. It has dwindled in size, but we have not yet really started the exploration of that other stream that flows in the direction of the chronic diseases of adult life and geriatrics. A whole new field of knowledge is waiting to be studied and mastered. We haven't even begun to think seriously about the sociological and public health aspects of old age and the chronic diseases. Neither medicine, nor industry, nor the State, has any carefully thought out program of what to do about the vast population of older persons that is rising in our midst.—Theodore Klumpp: The Future of the Older Worker, Geriatrics 2:165 (May-June) 1947.

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SEPTEMBER, 1947

## MR. JAMES T. BARNES, OUR EXECUTIVE SECRETARY

In 1943 Dr. Donnell Cobb offered in his presidential message to the House of Delegates the suggestion that our State Society would soon need the services of a full-time secretary. This suggestion, Dr. Cobb hastened to explain, was "not to be taken as a reflection on our previous secretaries or on . . . our present secretary."

During the war it would have been virtually impossible to carry out this suggestion, and no further steps were taken until Dr. Oren Moore, in his presidential address in 1946, said that "The activities of this Society have grown to the point where they represent big business . . . and we beg to present for your consideration that a full-time executive secretary will shortly be needed."

The past year saw this suggestion reach fruition when a committee, with Dr. Erick Bell as chairman, was appointed by the Executive Committee to secure a whole-time executive secretary. This committee recommended Mr. James T. Barnes, formerly of Wilson County, now of Raleigh. In the "Bulletin Board" of this issue will be found the announcement of Mr. Barnes's appointment, and a sketch of his activities since he completed a premedical course at the University of North Carolina in 1923. It will be noted that Mr. Barnes has had ample opportunity to become acquainted with doctors, and that his training should fit him to understand the professional viewpoint—a most important consideration for a lay secretary. Further help in understanding the aims of organized medicine is to be had from Dr. McMillan, who is to remain as secretary-treasurer.

The NORTH CAROLINA MEDICAL JOURNAL wishes to extend to Mr. Barnes best wishes and assurance of its desire to cooperate with him in every way in the future. As for Dr. McMillan, there is little to add to what Dr. Cobb said in 1943: "I personally do not understand how it is humanly possible for him to conduct his large and successful private practice, and at the same time, give himself so wholeheartedly to the many duties of his office." Our Society has been most fortunate to have had him through the trying years of the war and the also trying period of reconstruction. The Society is also fortunate that he will remain as its medical secretary, for his wise counsel, now based upon long experience, will be most helpful.

* * * *

## NORTH CAROLINA HONORED BY THE AMERICAN MEDICAL ASSOCIATION

(The following editorial was written by the chairman of the editorial board at the request of President Frank Sharpe.)

* * *

The Medical Society of the State of North Carolina was accorded a high honor when the editor-in-chief of the NORTH CAROLINA MEDICAL JOURNAL was elected to the board of trustees of the American Medical Association to fill out the term of the late Dr. Charles W. Roberts of Atlanta. Those of us who know Wingate Johnson realize full well that this mantle could not have fallen on shoulders more worthy to wear it. A keen clinician, a writer both of medical and lay papers—the former appearing in the best medical journals in the country and the latter in the highest type of magazines published—, a first-class editor, a man ever interested in the welfare of medicine and standing for everything that is highest and best in our profession, an individual beloved throughout the state not alone for his intellectual prowess but also for his personal charm—surely such a man will add luster to the board of trustees of the largest medical organization in the world.

We rejoice for him; we rejoice for ourselves. His election places the state of North Carolina another step to the fore on the medical map; and we may be sure that in his deliberations with the trustees he will ever further the advancement of medicine in North Carolina, clinging always to the highest medical and ethical ideals. We congratulate him and wish him much success in his newly acquired post of honor.

PAUL H. RINGER, M.D.

* * * *

## A DISTINGUISHED SERVICE MEDAL FOR THE GENERAL PRACTITIONER

From time to time this JOURNAL has called attention to the ways in which the American Medical Association is showing its interest in the future of the general practitioner. One of the most significant actions since the formation of the Section on General Practice was taken by the board of trustees at its meeting in Chicago on September 4 and 5(1). A special gold medal was established, "designed . . . to honor a general practitioner who has served as a family physician and who has in that capacity received the recognition of the community."

The General Practitioner's Medal will be similar to the one that has been given annually since 1938 for scientific advancement in the field of medicine. Nominations for the award, together with the qualifications of the candidate, may be submitted to the A.M.A. headquarters in Chicago by any state medical association, by any community service club, or by Chambers of Commerce, women's clubs, or similar organizations. Nominations should be addressed to the General Practitioner Award, American Medical Association, 535 North Dearborn Street, Chicago 10. From the names submitted the executive committee of the Section on General Practice will select five names, from which the board of trustees will nominate three to be voted on by the House of Delegates. The first award will be made at the supplemental session in Cleveland in January.

This action of the board of trustees should do much to raise the morale of the general practitioner, and to stimulate interest in the most important job in the medical profession. By it "the American Medical Association will focus the interest of the medical profession and the people of the United States on the tremendous services given to them by the general practitioners of medicine."

* * * *

## TWO DOCTORS OF THE OLD SCHOOL

The medical profession of North Carolina is poorer today because of the passing of two general practitioners—Dr. C. A. Anderson of Burlington, and Dr. R. U. Zimmerman of Welcome. Each of these men represented the highest type of family doctor. Although their conceptions of service were entirely different, each served his profession with whole-hearted devotion. Memorials to both are to be found in the appropriate department of this issue, but it seems fitting to pay editorial tribute to these men as symbolizing the spirit of general practice.

Dr. Anderson was a student throughout his long professional career. He was not content to consider himself a finished product when he was handed his medical diploma, but kept up with medical progress by constant reading of medical literature, by attending medical meetings, and by repeated postgraduate study. "On several occasions in early professional life he left his practice for periods of months to a year to study in Baltimore and New York." His life is singularly reminiscent of the subject of Osler's "Alabama Student."

Dr. Anderson, to the very end, had the intellectual curiosity of the true scientist. His practice was made more interesting because he was carrying on one bit of clinical research after another. Three of his original articles have been published in the NORTH CAROLINA MEDICAL JOURNAL since 1942(1).

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1. A.M.A. Medal to Honor General Practitioner, Editorial, J.A.M.A. 135:98 (Sept. 13) 1946.

1. (a) Anderson, C. A.: Hot Douche, North Carolina M. J. 3:644-645 (Dec.) 1942; (b) Anderson, C. A., Carrington, G. L., and Brooks, R. E.: The Use of Mineral Oil by Mouth and by Bowel, Ibid 5:87-90 (March) 1944; (c) Anderson, C. A.: The Importance of the pH in the Treatment of Diseases of the Vagina, Ibid 8:29-31 (Jan.) 1947.

Dr. Zimmerman, in contrast, never wrote a medical paper in his life. He seldom attended medical meetings, although he often sought the advice of his colleagues, and through the free interchange of ideas that is one of the glories of the medical profession he kept up with medical progress amazingly well. His devotion to his patients was whole-hearted. He was known to them all as "Dr. Bob." They loved him and had complete confidence in him. No night was so dark, no weather so bad, and no family so poor or undeserving that he refused to go when called. He died literally in harness. While examining a patient in his office, he slumped to the floor and answered his final call. Almost certainly that is the way "Dr. Bob" would have chosen for himself.

Both Dr. Anderson and Dr. Zimmerman, although different, were real doctors of the old school; and both left examples which may well be emulated by their survivors.

* * * *

## HAVE MERCY, UNCLE SAM!

The Harrison narcotic law was passed in 1914. It has, from the beginning, met with the approval of the overwhelming majority of physicians in the United States, most of whom have tried conscientiously to observe it. It has been necessary, for the sake of a very small minority of doctors, to establish penalties for willful violations of the act. At least two physicians of Winston-Salem, however, are wondering if the penalty for unintentional violation is not rather stringent.

Each of these doctors late in June had serious illness in his immediate family, in addition to unusually heavy professional duties. Furthermore, their faithful secretary, who had reminded them for many years to pay this tax on time, was out of the office because of a broken leg. One of them, who had paid the tax on or before July 1 every year since the law went into effect, sent in his dollar three days late; the other, who had paid just as regularly since he began practice in 1936, was one day late. Each of them received his license within a few days, but it was followed six weeks later by two form letters from the collector of internal revenue. In the first, the Commissioner of Internal Revenue advised them that they had "violated the Harrison Narcotic law as amended, by reason of your failure to pay special tax imposed thereby within the prescribed time." Attention was called to section 9 of the act: "That any person who violates or fails to comply with any of the requirements of this act shall, on conviction, be fined not more than $2,000 or be imprisoned not more than five years, or both, in the discretion of the court."

The second letter conveyed the stern warning that no leniency was to be expected because the tax had been paid; tardiness must be penalized. One ray of hope was offered, however: the Commissioner of Revenue graciously consented to consider, "in lieu of the specific penalty imposed by Section 9," "Offers in Compromise." It was indicated "that the minimum amount which will be given consideration is $5.00." A form was enclosed, to be filled out and sent to the collector of internal revenue in Greensboro for transmission to the Commissioner of Revenue in Washington. This form was for the purpose of explaining why the doctors had committed such a heinous offense, and why they thought they should not be sent to the penitentiary or fined $2000—or both. The completed form was to be accompanied by a peace offering of $5.00 in the form of a cashier's check, a money order, or registered cash. (Evidently Uncle Sam's minions have been trained to trust nobody. The doctor is not trusted to send a check that will not bounce, and the post office employees are not trusted to transmit money in an envelope unless it is registered.)

Five bucks, even of our present devaluated currency, is a good deal of interest to pay on one dollar for one day, or even for three days. Insurance companies, supposed to be "soulless corporations," allow thirty days of grace on premiums, and are satisfied with 6 per cent interest on payments delayed after that time. At 6 per cent—the usual maximum legal rate—the interest on one dollar would amount to about 1/60 of a cent per day, or 1/20 for three days. The interest demanded by Uncle Sam amounts to considerably more than 500 per cent in one case and to more than 1500 per cent in the other. Even at this exorbitant rate, however, $5.00 seems a picayunish compromise for our great federal government to accept in lieu of a $2000 fine or five years in the penitentiary. If a delay of one to three days in remitting the narcotic tax is the criminal offense that the penalty would suggest, Uncle Sam is merciful indeed to two poor medical sinners.

# Clinicopathologic Conference

## BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

This 62-year-old widow was admitted to the medical service of the North Carolina Baptist Hospital on May 17, 1946. She had had symptoms and signs of diabetes for two months, but the presence of this disease was not diagnosed until about one week prior to admission, and she had had no treatment for it. At the time of her admission, her chief complaint was of right lower abdominal pain which began on May 16, 1946, and had become more severe, with cramping pains, nausea, and vomiting. When admitted to the hospital, the patient had a strong odor of acetone on her breath, and the mucous membranes were quite dry. Her temperature (oral) was 101 F., and her pulse was 120 per minute. The abdomen was slightly distended, especially in the lower half, where there was marked abdominal rigidity and tenderness, and only rare peristaltic waves were heard. Vaginal examination revealed a small, eroded cervix; a little pale, bloody discharge was left on the examining finger. The uterus and adnexa were not palpable because of tenderness in the upper part of the vagina and lower part of the abdomen.

At the time of admission, accessory clinical findings were as follows: Urinalysis showed clear, yellow urine with a specific gravity of 1.015, an acid reaction, no albumin, a 3 plus reaction for sugar and 4 plus for acetone. The hemoglobin was 15 Gm. per 100 cc., and the red blood cell count 4,750,000. There were 11,600 white blood cells, with 56 per cent segmented polymorphonuclears, 24 per cent non-segmented polymorphonuclears, 15 per cent lymphocytes, and 4 per cent monocytes. The blood sugar was 210 mg. per 100 cc., and the carbon dioxide combining power of the blood was 31 volumes per cent.

A plain x-ray film of the abdomen, taken on May 18, showed probable partial small bowel obstruction. There was moderate gaseous distention of the small bowel loops in the right lower and middle parts of the abdomen, probably in the terminal ileum.

The patient was given insulin and fluids by vein, and a Miller-Abbott tube was inserted. On the night of admission her temperature rose to 103 F.

The day following admission urinalysis showed practically the same findings as on May 17, except that the sugar content of the urine had risen from 3 plus to 4 plus. The blood sugar had fallen to 193 mg. per 100 cc. and the carbon dioxide combining power had risen to 61 volumes per cent. Sodium sulfadiazine was given intravenously and penicillin intramuscularly.

On May 19 the patient's condition was growing steadily worse, and she was subjected to a low spinal anesthetic and exploratory celiotomy, which revealed a ruptured appendix with a large appendiceal abscess. The appendix was removed and the abscess drained. The pathologic diagnosis on the specimen was acute gangrenous appendicitis.

Following operation the patient was sustained with intravenous fluids, in which was included sodium sulfadiazine. Penicillin was also continued intramuscularly and she was given considerable protein hydrolysate, plasma, and whole blood. Her temperature subsided slowly. On the ninth postoperative day examination of the chest revealed diminution of breath sounds and decrease in resonance over the lower half of the right lung. An x-ray film taken at this time revealed the presence of a pleural effusion in the right lower chest, with pneumonitis in the right lower lung field, and moderate cardiac enlargement. It was felt that the subphrenic space posteriorly on the right side was infected, but since her temperature was only slightly elevated, it was decided to treat her conservatively for the time being.

Pelvic and rectal examinations at this time showed some induration in the recto-uterine space. On June 3, under low spinal anesthesia, this area was drained of about 500 cc. of purulent, grey, blood-streaked pus. On June 23 about 40 cc. of serous fluid was drawn from the right pleural space and 200,000 units of penicillin was injected into the pleural cavity. The fluid removed from the pleural cavity was sterile. By July 11—approximately two months after admission—the patient was able to be up and about. She was discharged on a special diet on July 12, with instructions to use 20 units of insulin daily for control of her diabetes.

She was readmitted to the hospital on August 28, 1946—approximately six weeks after discharge. She was quite jaundiced and reported that six days previously, following an attack of lower abdominal pain, she had become nauseated and vomited. Two days later, the family noted the yellow color of her sclerae. Since then the jaundice had been progressive and all stools white. She had had no chills or fever, and no notable pain in the right upper quadrant, although some upper abdominal discomfort was present.

Examination revealed definite icterus, but the patient was in no acute distress. Her temperature was normal, pulse 108, respiration 14, blood pressure 150 systolic, 80 diastolic. The chest was clear to percussion and auscultation, and the heart was enlarged to the left. The abdomen was slightly tender below the right costal margin, and a vague mass was felt in the gallbladder region. There was more tenderness in the right flank, with some rebound tenderness, and also some tenderness in the lower abdomen, most marked on the left side. The liver was felt two fingers' breadth below the costal margin, and was rather firm and tender.

On August 29, an x-ray of the chest and a plain film of the gallbladder region were negative. Accessory clinical findings at this time showed the urine to have a specific gravity of 1.007, an acid reaction, and no albumin and sugar; microscopically, 5 to 6 white blood cells were seen per high power field. The hemoglobin was 14.8 Gm. and the red cell count 4,650,000. There were 4,200 white blood cells, with 49 per cent segmented polymorphonuclears, 9 per cent non-segmented polymorphonuclears, 5 per cent eosinophils, 2 per cent basophils, 30 per cent large lymphocytes, and 6 per cent monocytes. The blood sugar was 107 mg. per 100 cc. and the carbon dioxide combining power was 37 volumes per cent. The serum bilirubin was 12.7 mg. per 100 cc. and the icterus index was 75 units. The stool examination was negative for bile pigments. The urine was positive for bile pigments, but negative for urobilinogen.

The patient received intravenous fluids and insulin, and on September 2 an exploratory celiotomy was done. At operation a small, contracted, thick-walled gallbladder was found. The common duct was opened, and a T-tube was placed in it and maintained there with four interrupted sutures. A biopsy specimen was taken from the inferior margin of the liver, and the abdomen was then closed. The patient did well following this operation, and on September 13 a cholangiogram was done; the contrast medium entered the common duct and passed freely into the small bowel; none was seen to pass back into the radicles of the liver.

The jaundice persisted and the patient had a very gradual return of strength and appetite, with a correspondingly gradual decrease in the jaundice. The jaundice was not completely cleared until December. The patient has been well since that time and her diabetes has remained under good control. She has had some indefinite pains in her legs which are possibly on a basis of peripheral neuritis.

### *Discussion*

DR. JAMES F. O'NEILL: It is significant that this patient had symptoms and signs of diabetes for two months before the diagnosis of diabetes mellitus was made. At the time of her admission she had diabetic acidosis, and one would have to consider the possibility that her abdominal pain was associated with the acidosis. Most discussions on acidosis omit pain as a symptom of the syndrome, but it is an established fact that pain may occur, along with leukocytosis, nausea, and vomiting. The marked rigidity and tenderness noted at the time of the original examination make it highly likely that the disorder was on an inflammatory basis, with peritoneal irritation and reflex rigidity. The decrease in peristaltic activity would support this view.

The distention of the small intestine visible on the plain x-ray film corresponds to the distribution of coils of ileum. It is extremely difficult to tell, when such loops are visualized, whether the cause is a dynamic or an adynamic ileus. The presence of a relatively quiet abdomen would tend to suggest that this finding was on the basis of a paralytic ileus. Such distended loops associated with pain, tenderness and rigidity, would make one consider the possibility of an intestinal strangulation. The pulse of 120 per minute was borderline; were it slower, one would lean away from strangulation; were it faster, one would be more suspicious of strangulation. In an elderly diabetic patient, particularly in an untreated one, the possibility of mesenteric arterial thrombosis certainly should be considered, since arterial disease is apt to occur earlier and be more severe in a diabetic than in a non-diabetic patient. Allen, Barker and Hines(1) have shown that arteriosclerosis obliterans occurred eleven times as frequently in diabetics as in non-diabetics in comparable age groups, and that the same lesion on the average occurred two decades later among non-diabetic women than among diabetic women. The unknown factor is whether these figures apply only to arteriosclerosis of the arteries of the extremities, or whether they appy equally to the visceral arterial supply.

After the first celiotomy had been done, the appendix removed, and the abscess drained, one might look back at this case, and conjecture as to whether nonsurgical management of this condition using massive doses of penicillin would have been justified. Crile(2) has reported good results in 50 patients with proved appendiceal peritonitis treated by the administration of 100,000 units of penicillin every two hours. For three reasons, however, it would have been extremely hazardous to pursue a nonsurgical form of treatment in this patient. First, the diagnosis was not clear cut and the possibility of strangulated intestine was great. Second, the patient was a diabetic, and therefore would stand infection rather poorly. Third, a great deal more experience is needed with the nonsurgical treatment of appendiceal disease before definite conclusions can be reached concerning the value of penicillin.

In view of subsequent events, it is important to remember that this patient received blood and plasma as well as protein hydrolysate intravenously. The presence of a pleural effusion in the right thorax with pneumonitis in the right lower lung field suggests the possibility of a subphrenic abscess with involvement of the diaphragmatic pleura, or an asymptomatic pulmonary embolism, or a pneumonitis with or without some pulmonary atelectasis. The induration in the pelvis, which was palpable on vaginal and rectal examination, is a manifestation of a fairly common complication resulting from the perforation of an intraperitoneal hollow viscus. It serves to emphasize the importance of frequent rectal or pelvic examinations on all patients who have had intraperitoneal contamination. It is interesting to observe the varied behaviour of these pelvic infectious processes. Many of them will resolve without ever forming a localized abscess, so that one should not be too hasty about performing incision and drainage. It is at times surprising to observe how rapidly and completely an abscess will heal after it has been drained either through the vaginal fornix or through the anterior wall of the rectum. Apparently the process in the right lung subsided without causing a bacterial infection of the pleura, for the fluid which was removed from the pleural cavity was sterile.

Jaundice coming on six weeks after the preceding illness presents a large number of diagnostic possibilities in this patient. The jaundice was progressive; abdominal pain was present, but chills and fever were absent; and there was no definite history of colic. The absence of chills and fever is against a pylephlebitis with single or multiple liver abscesses. It would likewise be against a cholangitis. One of the usual types of extrahepatic obstructive lesions could cause such a syndrome, for stones in the common duct are at times painless, and one must always consider the possibility of carcinoma of the ampulla of Vater, or carcinoma of the head of the pancreas. It is well to bear in mind, however, that carcinoma of the head of the pancreas is not usually as painless as it is often described in the literature. A hepatocellular type of jaundice would have to be considered also as a possible result of hepatitis, Weil's disease, or acute yellow atrophy of the liver; the latter two possibilities are rather unlikely, however, because the patient's illness was not severe enough. The last possibility which one would have to consider in this patient is hemolytic jaundice, and there was no evidence of its presence from her blood count. The tenderness in the right upper quadrant could be associated with an enlarged liver due to biliary cirrhosis from biliary obstruction.

Obviously, the important point in this diagnostic problem hinges on whether this was an obstructive type of jaundice which was amenable to surgery, or whether it was a hepatocellular or hemolytic type, neither

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1. Allen, E. C., Barker, N. W., and Hines, E. A., Jr.: Peripheral Vascular Diseases. Philadelphia, W. B. Saunders Co., 1946.
2. Crile, G., Jr.: Peritonitis of Appendiceal Origin Treated with Massive Doses of Penicillin: Report of 50 Cases. Surg., Gynec. & Obst. 83:150-162 (Aug.) 1946.

of which is an indication for celiotomy. Although the patient's diabetes was under good control, the elevation of the serum bilirubin and icterus index with a stool which was negative for bile is some evidence that an obstructive lesion of the biliary passage existed. The increase in bile pigments in the urine was simply an indication that the increased amount of bile pigments in the blood was being excreted through the kidney. The fact that the urine was negative for urobilinogen is another bit of evidence that the jaundice had entered the later stages of the obstructive type. It is accepted by most physiologists that bilirubin which is excreted by the liver in the bile is converted in the intestine to urobilinogen as a result of the action of intestinal bacteria. Part of this urobilinogen is excreted in the stools; part is absorbed from the intestine and goes by means of the portal system back to the liver and is re-excreted in the bile. A small part, however, is excreted in the urine, so that it is common to find small amounts of urobilinogen normally in the urine. When an obstructive lesion of the biliary tract occurs so that bilirubin can no longer get into the intestine, no new urobilinogen will be formed in the intestines; the urobilinogen which was already there, however, will act in two ways: first, some of it will be excreted in the stool, and second, some of it will be reabsorbed in the portal system and returned to the liver. Since the obstructive process is still present, however, and it cannot be excreted in the bile again into the intestine, it will be absorbed into the blood and excreted in increased quantities in the urine. Thus, in the early stages of an obstructive type of jaundice, urobilinogen is usually present in the stool and the amount of urobilinogen in the urine is increased. As the obstructive process continues, however, all of the urobilinogen will leave the intestinal tract and the stool will become negative for urobilinogen. Since no more can be reabsorbed through the portal system and returned to the liver, there will be no more available in the blood stream to be excreted in the urine, and the appearance of urobilinogen in the urine will cease.

In this patient, every evidence indicated that this was an obstructive type of jaundice. Even though one takes into consideration the possibility that the obstruction, instead of being in the large extrahepatic bile passages, might be in the small intrahepatic biliary canaliculi as a result of hepatitis, it is impossible to rule out the presence of stones, strictures, or malignant lesions either of the head of the pancreas or of the ampulla of Vater. Therefore, celiotomy with exploration of the biliary tree certainly was indicated in this patient, even though no obstructive lesion in the extrahepatic biliary passage was found. This negative finding is very strong evidence that the obstructive process was one present within the liver itself, and suggests the possibility that this lesion might well have been a form of hepatitis, either of the epidemic or of the homologous serum type, causing obstruction of the small intrahepatic biliary canaliculi as a result of edema of the liver itself.

I would like to ask Dr. George Harrell if he would discuss these possibilities for us, since he is so much better qualified to do so.

DR. GEORGE T. HARRELL (Internist): When the etiologic agents which can be more easily demonstrated — Endamoeba histolytica and Leptospira icterohaemorrhagiae— are ruled out, cases of infectious hepatitis are said to be of viral etiology. Two types of infectious hepatitis have been clearly differentiated(3). The first is due to a filtrable agent found in the feces and urine of infected patients. This agent has been shown to be transmissible to volunteers by ingestion, and to have been carried in water in some epidemics(4). The incubation period is roughly four weeks. Because of the problems connected with sewage disposal in wartime, epidemics have been much more frequent during wars than in peace. The disease may run a relatively chronic course and carries an appreciable mortality. It is still a moot point as to whether a *chronic* viral hepatitis can occur and progress directly to cirrhosis without reinfection(5).

The second type of infectious hepatitis due to a filtrable agent is usually termed homologous serum jaundice. The agent is found in serum or plasma and is transmitted by the injection of minimal amounts of infected material. Even as little material as would cling

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3. Sodeman, W. A.: Infectious Hepatitis. Am. J. M. Sc. 212: 91-106 (July) 1946.
4. Neefe, J. R. and Stokes, J., Jr.: An Epidemic of Infectious Hepatitis Apparently Due to a Water Borne Agent. J.A.M.A. 128:1063-1075 (Aug. 11) 1945.
5. Watson, C. J. and Hoffbauer, F. W.: The Problem of Prolonged Hepatitis with Particular Reference to the Cholangiolitic Type and to the Development of Cholangiolitic Cirrhosis of the Liver. Ann. Int. Med. 25:195-227 (Aug.) 1946.

to a syringe may produce infection. Hepatitis occurs very rarely if whole blood is administered. The incubation period is in the range of four months. The mortality is quite low and the cases do not tend to run as chronic a course as those of the first type. Cross-infection experiments in volunteers(6) have shown that these two filtrable agents are not the same and do not confer cross immunity. The two types of infectious hepatitis are most easily differentiated by the history, epidemiology, and incubation period.

Dr. Manson Meads (Internist): Homologous serum jaundice has been reported following transfusion with serum, plasma, or blood, and after the use of improperly sterilized syringes for drawing blood or giving intravenous injections. The highest incidence follows the use of large pools of serum or plasma, where chance contamination is greatest (7.3 per cent in a British series(7)). Neefe and his associates(8) recently reported that a serious problem of wastage of pooled plasma, including large supplies of Red Cross plasma, is resulting. While working on a solution for this problem, these investigators found that if human albumin contaminated with the virus of homologous serum jaundice is heated for ten hours at 60 C. in the presence of a protein stabilizer (acetyl tryptophane and sodium caprylate), the virus is destroyed without rendering albumin unsatisfactory for use. By the use of a method such as this, salvage on a large scale is possible.

Dr. David Cayer (Internist): Marked alterations in the concepts of the etiology of liver disease in the past few years have resulted in changes in therapy which have greatly altered the prognosis for this group of patients. We have for some time been interested in the use of lipotropic substances, particularly methionine, in the treatment of both the acute and chronic forms of hepatitis, with and without ascites. In patients having *acute* infectious hepatitis, the duration of icterus, gastrointestinal symptoms, and laboratory evidences of disturbed liver function were apparently unaltered by the addition of methionine. The duration of hospitalization was essentially the same as that in an untreated group. This finding confirms the experience of others who have used as much as 7.5 Gm. of methionine daily in these acute cases without demonstrable benefit(9).

The beneficial effects of a high carbohydrate and high protein intake in such patients are generally accepted. The only other important principle of treatment upon which there is general agreement is bedrest. Recurrences are often precipitated by inadequate hospitalization and fatigue resulting from a too rapid return to excessive physical activity.

Dr. Felda Hightower (Surgeon): One other patient was in the hospital at the same time that the one under discussion was studied, and it was felt that both patients had probable homologous serum hepatitis. The other patient had a cholecystectomy for acute cholecystitis and cholelithiasis about three months prior to onset of her jaundice. The progressive jaundice, rather persistent right upper abdominal pain, and enlarged liver, plus the absence of urobilin and urobilinogen in the urine and the presence of bile in the urine, led us to believe that the patient had acute obstructive jaundice, probably due to stones in the common duct. Celiotomy and exploration of the common bile duct revealed no obstruction, and a section of the liver revealed chronic hepatitis with a picture of cirrhosis. Unfortunately, that patient died, and the diagnosis at autopsy was cirrhosis of the liver and some chronic localized inflammation in the terminal ileum.

An exploratory operation was also performed in the patient under discussion tonight, and no obstruction was found in her common bile duct either. Biopsy of the liver revealed chronic hepatitis or cirrhosis, but fortunately she recovered.

Letters were sent to all the blood donors and those donating to the plasma pool from which these patient received plasma, but only about half of them responded. They steadfastly denied any gastro-intestinal disturbances, hepatitis, or jaundice. It is indeed unfortunate that we have not been able to get responses from the other donors to the plas-

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6. Neefe, J. R., Stokes, J., Jr., and Gellis, S. S.: Homologous Serum Hepatitis and Infectious (Epidemic) Hepatitis: Experimental Study of Immunity and Cross Immunity in Volunteers, Am. J. M. Sc. 210:561-575 (Nov.) 1945.
7. Spurling, N., Shone, J. and Vaughan, J.: Incidence, Incubation Period and Symptomatology of Homologous Serum Jaundice, Brit. M. J. 2:409-412 (Sept. 21) 1946.
8. Neefe, J. R., Stokes, J., Jr., Gellis, S. S., and Blanchard, M. A.: Studies on the Control of Hepatitis Virus in Blood and Blood Products, read before the American Society of Clinical Investigation, Atlantic City, May 5, 1947.
9. Cayer, D.: Clinical and Laboratory Observations on the Use of Methionine and Vitamin Supplements in the Treatment of Liver Disease, Arch. Int. Med., in press.

ma and blood bank pools, because one of those who did not reply could have had at least a mild case of hepatitis, with or without jaundice, and could have transferred the infection to one of these patient receiving his blood or plasma.

### *Anatomic Discussion*

DR. ROBERT P. MOREHEAD: As a result of periportal lymphocytic infiltration and degeneration of liver cells in the vicinity of the central veins, the liver lobules in the biopsy material were rendered more distinct. Although frank necrosis of the hepatic cells was not present, cloudy swelling, pyknosis, and in some instances incomplete chromatolysis were noted. This process, as is noted above, was most distinct in the vicinity of the central vein of the lobule. Some bilirubin staining of the liver cells and varying numbers of bile thrombi were also seen and were particularly prominent in this area. The outstanding feature in the microscopic picture, however, was the pronounced periportal infiltration of lymphocytes.

The pathologic picture of infectious hepatitis varies markedly with the severity and duration of this disease. In its early stages the microscopic findings in the liver may be quite normal or, as in this case, they may show rather pronounced changes. In those cases in which the microscopic changes appear inadequate to account for the jaundice, it has been suggested that it is due to increased permeability of the cholangioles(5). Although the changes in the liver in this case were rather marked, the patient's symptoms cannot be fully explained on morphologic grounds.

The exact relationship between infectious hepatitis and cirrhosis awaits clarification.

### *Anatomic Diagnosis*

Hepatitis of unknown etiology

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**Too often it is assumed** that the control of tuberculosis is solely the health department's domain of action. This is not true, nor can it ever be true, so long as men practice the ancient art of medicine. The family doctor in the city, the country doctor going about from farm to farm, the village doctor in his office over the drug store know the people, have their trust, and guide their physical destinies. The educational pamphlets of a hundred organizations cannot have the enduring effect nor the permeating persuasiveness of the doctor's personal word. —Herman E. Hilleboe, M.D., Pub. Health Rep., Dec. 6, 1946.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.

RALEIGH

NURSE-ANESTHETIST: *A duly licensed, experienced, and trained nurse, employed by a licensed physician and surgeon to administer anesthetics under his personal direction and supervision, is not engaged in the practice of medicine within the meaning of the law.*

The State Board of Medical Examiners in the case at hand entered suit against a privately employed nurse-anesthetist, charging her with practicing medicine without a license. Her employer, a surgeon, was made a co-defendant.

The nurse involved held a license to practice her own profession, but a certificate never had been issued to her by the Board authorizing her to engage in medical practice. She had had special training in anesthesiology and wide experience in administering anesthetics. Her duties with the surgeon were to administer anesthetics to patients at his direction and under the personal supervision of her employer. She did not hold herself out as a physician, had no office, and only performed such duties as were assigned her by the surgeon. She worked for no one except the employer referred to above.

In Circuit Court it was found that the nurse actually performed such duties as were construed to be a part of medical practice—duties which were, in fact, considered by many to be a highly specialized type of endeavor. It was admitted by both the plaintiffs and the defendants that in some states such activities upon the part of nurses were prohibited, while in other states nurses were employed by hospitals and physicians to act as anesthetists, and such duties were not considered as medical practice. There seemed to be no criticism of the nurse's qualifications to administer anesthetics. She gave evidence of a successful career in such work.

The decision in Circuit Court was for the State Board of Medical Examiners. It was found by this court that the nurse, in administering anesthetics, was actually engaging in the practice of medicine. The physician employer was, as stated above, included as a co-defendant, and while the record is not clear it is assumed that he was charged with associating with an unlicensed practitioner. The action being brought in a court of chancery, it is also assumed that the judgment was in the nature of a restraining order instead of a sentence for a criminal offense. The defendants appealed to the Supreme Court.

The Court of Appeals reversed the findings of the court below and ordered a new trial in keeping with the opinion expressed by the appellate tribunal. This court ruled that, according to the statutes of the state in which the action arose, the nurse was not engaged in medical practice, despite the fact that she was not always, in every detail, under the supervision and direction of her employer. This the court compared to the administration of other drugs in the course of the nurse's duties when caring for patients in general. As in many other instances, the nurse-anesthetist was considered a trained technical assistant.

The above ruling did not settle the question as to the other states. The decision was based entirely upon the law in force in the state where the action was tried.

Many doctors and lawyers will find it difficult to agree from a medical standpoint that the administration of anesthetics is anything less than a very highly specialized type of medical practice. Laws with reference to the matter now existing in the several states must, until changed, be strictly interpreted. The statutes of the state of North Carolina are similar, in a way, to those of the state where this action originated and was tried. There is no law specifically prohibiting nurses, or anyone else, from administering anesthetics, except the one making it necessary for those engaged in the practice of medicine to be properly licensed for that purpose. This being the case. the decision as to whether it is legal for them to carry on this particular type of work depends upon the interpretation of the courts as to what constitutes medical practice.

(Court of Appeals of Kentucky, 194 S. W. 375, May, 1917.)

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**Veterans with chronic ailments** who can not support themselves are cared for in VA homes. The number now in homes is the largest since the beginning of World War II.

TUBERCULOSIS ABSTRACTS
*A Review for Physicians*
Issued Monthly by the National Tuberculosis Association
Vol. XX September, 1947 No. 9

THAT mortality statistics fail to show the magnitude of the tuberculosis problem in any community is not a new idea. An individual may have been spreading tubercle bacilli for years yet heart disease or an intercurrent infection may account for the terminal diagnosis entered on the death certificate. Pathological reports, when available, give a more accurate measure of the amount of tuberculosis in the population than do vital statistics.

### A Pathologist Looks at TB

The autopsy records for the past ten years at Bellevue Hospital (New York City) reveal some important facts about the tuberculosis problem in this large metropolitan institution. Much of the information in these records is not found in death certificates and hence does not appear in vital statistics.

In the period from 1935 to 1945, 7,631 complete post-mortem examinations were done on individuals over 16 years of age, from all hospital services. One case out of every 10 examined revealed tuberculous cavitation. Tuberculosis as the cause of death in the whole group showed the highest rate between the ages of 16 and 40. However, two out of three of all the "spreaders" of tubercle bacilli were over 40 years of age, with many of them dying from causes other than tuberculosis. Most deaths from all causes in hospitals are in individuals over 40 years of age. In the epidemiology of tuberculosis the number of cases "spreading" the infection—not the mortality rate within a certain age group—is the important and too often overlooked fact in the attack upon the tubercle bacillus.

The records of the cases with tuberculous cavity formation show that 13 out of every 100 were not recognized clinically. Eight out of every 10 of the unrecognized cases were in individuals over 50 years of age.

The reasons for this situation may be many, but three are outstanding. First, a disease of more serious immediate concern was the reason why the individual became a hospital patient. Second, non-tuberculous lung diseases are more common in older persons which makes a correct diagnosis of tuberculosis more difficult. Third, the old dictum that serious tuberculosis is rarely acquired after 40 years of age has tended to dull medical thought about this disease in older persons unless there is a history of tuberculosis. A case with a cancer and a tuberculous cavity may die from the cancer but the spread of tubercle bacilli can be just as effective as if the whole process were tuberculous in nature. From these data, it is easy to see why the program to X-ray the chests of all hospital admissions and out-patients is of great importance.

The tuberculosis problem in a hospital may not truly reflect that of the community, for only those with serious illness will be represented. For the past two and one-half years an opportunity has been given to examine all cases of unexpected deaths, including deaths from accident, from suicide, from homicide and from obscure causes in Manhattan. The group is a representative cross-section, though small, of the inhabitants of New York City.

In this discussion, only the presence of tuberculous cavity will be considered, for this group represents the "spreaders" of the tubercle bacillus. In a group of 1,235 adults over 20 years of age, tuberculous cavity formation was observed in one of every 20 cases. No tuberculous cavity was found in 100 individuals under 20 years of age. One in every 16 white males, one in every 24 Negro males, one in every 30 Negro females and one in every 116 white females showed tuberculous cavity formation. In this group, open tuberculosis with cavity was present four times more often in the adult male than in the adult female. In males over 30, six out of every 100 showed the presence of tuberculous cavity.

From these few figures, an idea of the tuberculosis problem on this congested island is obtained. The individuals in the group examined represented many occupations—salesman, waiter, porter, housemaid, truck driver, bartender, elevator operator, auditor, clerk, gangster, etc. Supposedly they were well and at work yesterday—today they are found dead. Among them, it was unusual to unearth a known tuberculosis case. The cause of death given by the Medical Examiner's Office reveals that in only one-fifth of these cavity cases is tuberculosis set down as the cause of death.

This shows how an erroneaus idea may be obtained with regard to tuberculosis when data from death registration receive undue weight. This also shows that if X-ray surveys are to be effective, every adult, especially all males, in a community should be included.

The socio-economic problem presented by the above figures looms large. It is the breadwinner who is most often infected. Those who mingle most in masses of humanity are the ones who most frequently contract a serious infection and who spread the infection most. No adult age group escapes and the problem of tuberculosis control demands maximum efforts to prevent exposure of adults to infection.

The decrease in tuberculosis in the very young has led some to believe that, if we can rear a population free from tuberculous infection, the problem of tuberculosis will be solved. No reasoning could be more unsound. There is plenty of evidence that young adults with negative tuberculin reactions can die from an infection acquired in adult life.

In the solution of the problem of tuberculosis the fullest cooperation of an enlightened public opinion is urgently needed. Any community with pride in the health of its citizens; with a compassion for those who, through no fault of their own, become ill; and with sure justice for those recalcitrants who knowingly endanger others can go far in the struggle against the tubercle bacillus. The crucial battle has barely begun. Let us see it through to success.

**A Pathologist Looks at TB, Edgar M. Medlar, M.D., Bulletin of the National Tuberculosis Association, January, 1947.**

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**During the past 50 years** tuberculosis has been declining more rapidly in childhood and adolescence than at any other age. In fact, tuberculosis has become primarily a disease of middle-aged and old people. In Massachusetts the reaction rate to the tuberculin test in school children dropped 50 per cent between 1925 and 1940, and the amount of pulmonary tuberculosis found by mass examination fell proportionately. In Tennessee, with a high tuberculosis death rate, the state department of health reports five cases per 1,000 among high school students, compared with two per 1,000 found in Massachusetts.—Alton S. Pope, M.D., NTA Bull., Nov., 1946.

# BULLETIN BOARD

## STATEMENT FROM THE SPECIAL COMMITTEE ON THE WORKMEN'S COMPENSATION ACT

To the Physicians of North Carolina:

The Committee appointed from the Medical Society of the State of North Carolina for the purpose of obtaining some badly needed changes in the methods of administration of the Workmen's Compensation Act, after a prolonged and earnest effort, was unable to secure any worthwhile corrections. The present administration of the act is so irritating and costly that the House of Delegates of the Medical Society of the State of North Carolina, at its 1947 meeting, and with a unanimous vote, discontinued the Medical Advisory Committee to the Interstate Commission and withdrew all endorsements, expressed or implied, of the methods of administration of the Workmen's Compensation Act and of any related fee schedules. Therefore, so far as the medical profession of North Carolina is concerned, there is no industrial fee schedule.

The Special Committee on the Workmen's Compensation Act, as appointed to serve for the 1947-1948 Medical Society year, urges that every physician in the state continue to give the best possible care to all injured persons and that bills for services covered by the Workmen's Compensation Act be submitted to the North Carolina Industrial Commission for approval as required by present regulations. The Committee recommends, however, that all former fee schedules be ignored and that the charges be the same as those which would be made for similar services rendered to persons of a like standard of living in their respective communities, when payment is made by the injured person.

The Committee requests that, should any charges be reduced by the Industrial Commission, an appeal be taken immediately to the Commission, and if the appeal should be denied, the facts in each such case be submitted to the chairman of this Committee.

Signed,
G. W. Murphy, M.D., Chairman
612 Flatiron Bldg., Asheville
Dr. A. C. Ambler, Asheville
Dr. T. R. Huffines, Asheville

Dr. Rowland T. Bellows
Professional Bldg., Charlotte
Dr. Harry Winkler
121 West 7th St., Charlotte
Dr. R. B. Davis
122 South Green St., Greensboro
Dr. Frank C. Smith
106 W. 7th Street, Charlotte
Dr. M. H. Greenhill
Duke Hospital, Durham
Dr. Verne S. Caviness
Professional Bldg., Raleigh
Dr. Hugh A. Thompson
309 Hillsboro St., Raleigh

## MEDICAL SOCIETY NAMES EXECUTIVE SECRETARY

Dr. Frank A. Sharpe, president of the Medical Society of the State of North Carolina, announces the appointment of James Thomas Barnes of Raleigh, formerly of Wilson County, as the first full-time salaried executive secretary of the Medical Society. Dr. Roscoe D. McMillan will continue to serve in the capacity of secretary as one of the executive officers of the Society after the new appointee assumes his duties late in September, and will be in a position to direct the work which he has so ably performed in the past.

Mr. Barnes is a native of Wilson County, having been educated in the public schools of the county and at the University of North Carolina, where he completed the premedical course in 1923 and subsequently studied in the field of social welfare at various intervals. He served as Superintendent of Public Welfare in and for Wilson County from 1923 to 1935, during which time he successfully organized and promoted various programs of the community health and welfare through such local agencies as the Family Welfare Society, American Red Cross, Tuberculosis Association, State Orthopaedic Clinic for Crippled Children, and Area Boy Scout Council, of which agencies he served as an executive officer at one time or another and as a director. During this time he served as president of the North Carolina Association of Superintendents of Public Welfare, 1929-30. He gained considerable note as a successful public welfare administrator during the early thirties, particularly in connection with the emergency programs for public relief, in which aspects of the public health were provided within the scope of the programs. Particular efforts in the county resulted in public responsibility for the hospital care and medical attention of the indigent. An acquaintance has said, "He knows the work and problems of the physician from the 'country doctor' in the community of his youth to the specialist in our hospitals and medical teaching centers of today."

For a time Mr. Barnes represented the State Board of Public Welfare as Field Social Work Representative for twenty of the northeastern counties. It was largely through his efforts that the public welfare departments in the counties of that area were organized, staffed and placed on an operating basis for the advent of the social security services accruing to the people from the Social Security Act of 1935 and from subsequent state legislation.

In the spring of 1936 Mr. Barnes joined the staff of the State Board of Health, at the invitation of Dr. Carl V. Reynolds and a committee of medical advisers, for the purpose of organizing and administering the state program for crippled children under the provisions of the Federal Social Security allocations made to the state by the U. S. Children's Bureau. During this tenure he was associated with Dr. George M. Cooper, whose eminence in the field of child health is generally recognized. This experience brought Mr. Barnes into active relationship with the medical profession throughout the state in projecting services to the needy crippled children in all sections of North Carolina. The crippled children's program was generally recognized as a departure in governmental service, in that it provided a public medical service on a state-wide basis. Much of the success of this program may be attributed to the soundness of the early administration of the service and to the effective collaboration of the profession in this cooperative enterprise.

Following the passage in 1943 of the Amended Vocational Rehabilitation Act by the Seventy-Eighth Congress, Mr. Barnes was engaged by the North Carolina Department of Public Instruction, Division of Vocational Rehabilitation, to fill the position of Physical Restoration Supervisor, in which he was charged with the sole responsibility to organize and administer services in the Physical Restoration Unit. The administration of this unit envisaged a broad program of medical and related services for the physically handicapped or disabled workers who could no longer carry on in their chosen vocation. This activity entailed the extension of service on a state-wide basis and concerned medical personnel throughout the state. Singular success has attended Mr. Barnes's efforts to operate the medical and hospital features of the program within the framework of organized medicine, including a negotiated system of remuneration to physicians for services. It is of note that the program has been more extensively and effectively administered in this state than in many others and, indeed, North Carolina ranks among the more progressive of all the states in the extent of the services rendered. Withal, there has been a close cooperation with the medical profession and allied services in the achievements in this program success.

At present Mr. Barnes serves in the following volunteer capacities: Board of Directors of the North Carolina Conference for Social Service (life); Board of Directors, North Carolina Maternal Health League; Board of Directors, North Carolina League for Crippled Children and Adults; alternate, Board of Directors of the International Society for Crippled Children and Adults; member, Advisory Child Welfare Committee of the State Department of Public Welfare; and secretary of the Wake County Chapter of the National Foundation for Infantile Paralysis. He previously served as secretary of the North Carolina Conference for Social Service, treasurer of the North Carolina Conference for Social Service, secretary and treasurer of the North Carolina Chapter of the American Association of Social Workers (1940-42), secretary of the Professional Advisory Committee (medical) of the North Carolina Division of Vocational Rehabilitation, and secretary of the State Advisory Council for Vocational Rehabilitation.

## STATE BOARD OF MEDICAL EXAMINERS

The North Carolina State Board of Medical Examiners will hold its next meeting for the purpose of interviewing applicants for licensure by endorsement in Asheville, October 20, 1947.

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

Dr. H. Stuart Willis, superintendent of the North Carolina Sanatoria, presented a paper before the British Empire Tuberculosis Conference in London on July 11, attended the International Congress on Microbiology in Copenhagen, Denmark, July 20-26, where he also presented a paper, and was present at the International Union Against Tuberculosis, July 26-August 1. He was one of the four delegates to represent the National Tuberculosis Association at the Copenhagen meeting.

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Joseph A. Staton of Greenville, N. C., joined the staff of the NCTA as field secretary on July 15. Mr. Staton received his A.B. degree at E.C.T.C. in 1942 and his Master's in Public Health Education in 1947 at the University of North Carolina.

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An endowment, to be known as "The Charles Hartwell Cocke Fellowship for Tuberculosis Research," will be set up shortly under the auspices of the National Tuberculosis Association. The fund, made available by Mrs. Amy Plank Cocke of Asheville, North Carolina, in memory of her husband, the late Dr. C. H. Cocke, will be administered by the NTA's Division of Research and will be used for financing research personnel.

Dr. Cocke, from 1913 to the time of his death in 1944, practiced medicine at Asheville. He was the author of numerous articles on the various aspects of tuberculosis, a member of the National Tuberculosis Association, the association's medical section, the American Trudeau Society, and a corresponding member of the International Union against Tuberculosis.

## NEWS NOTES FROM THE DUKE UNIVERSITY SCHOOL OF MEDICINE

Dr. William A. Perlzweig has received three months' leave from his duties as professor of biochemistry in the Duke University School of Medicine. He will visit Palestine and act as special adviser to the Hebrew University and the Hadassah Medical Organization in the proposed establishment of a medical school in the University at Jerusalem.

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Miss Mary C. Singleton, of the Duke Hospital division of physical therapy, has been elected chairman of the House of Delegates of the American Physical Therapy Association. Miss Singleton has been a member of the association since 1934 and has previously served as president of the Carolina chapter and as vice chairman of the House of Delegates.

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Dr. William W. Hurteau, Davenport, Iowa, has been appointed an instructor in the Department of Pathology. Following graduation from the University of Iowa School of Medicine in 1937, he completed an internship and assistant residency in medicine and neuropathology at the Montreal General Hospital; two years of pathology at the Army Institute of Pathology, in neuropathology; a fellowship in neuropathology with Dr. Walter Freeman at the George Washington University School of Medicine; an administrative service with the third and ninth Armies; and service in pathology at the Brooks General Hospital, Fort Sam Houston, Texas.

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A portrait of Dr. W. C. Davison, dean of the Medical School, has recently been finished by the artist Wayman Adams. This is a gift of the medical alumni and will be presented to the school at the annual fall symposium which will be held on October 17 and 18.

## FOURTH DISTRICT MEDICAL SOCIETY

Dr. Frank Sharpe, president of the State Medical Society, was guest speaker at the meeting of the Fourth District Medical Society which was held in Smithfield on August 13. Dr. Sharpe discussed the objectives of the State Medical Society for this year.

## CATAWBA VALLEY MEDICAL SOCIETY

A regular meeting of the Catawba Valley Medical Society was held in Hickory on August 19. Speakers were Dr. E. H. Ellinwood of Hickory and Dr. S. M. Bittinger of Oteen. A moving picture on cancer was shown, and case reports were given from the floor.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

Dr. D. L. Knowles, president of the Edgecombe-Nash Counties Medical Society, has appointed a blood bank committee to organize a blood bank for Rocky Mount. Members of the committee are Dr. Adam Thorp, Dr. J. E. Wright, and Dr. Kenneth Weeks.

## NEWS NOTES

Dr. Charles W. Armstrong of Salisbury was elected president of Kiwanis International at the thirty-second annual convention in Chicago on July 2.

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At the annual meeting of the American Student Health Association in New York City on May 7, Dr. Ruth M. Collings, physician for the Woman's College of the University of North Carolina, was re-elected vice president.

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Dr. W. E. Cook of Mebane, president of the Alamance-Caswell Counties Medical Society and former assistant medical director of the Alamance County Tuberculosis Sanatorium, has been named to succeed the late Dr. F. T. Harper as medical director of the sanatorium. Dr. Harper was killed in an airplane crash on July 4.

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Dr. Archie Y. Eagles has announced the opening of offices for the practice of internal medicine in Wilson. Following his graduation from the Duke University School of Medicine and two years' training in the Baltimore City Hospitals, he spent five years on active duty with the army medical corps. Since his release in January, 1946, he has spent twelve months as clinical fellow on medicine at the Duke University School of Medicine.

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Dr. James David Stratton, recently of the Illinois Eye and Ear Infirmary, has announced the opening of offices for the practice of ophthalmology in Charlotte.

## SOUTHERN MEDICAL ASSOCIATION

The annual meeting of the Southern Medical Association will be held in Baltimore November 24-26. Hotel reservations should be made through the Hotel Committee, Southern Medical Association Meeting, 1714 O'Sullivan Building, Baltimore 2, Maryland.

(BULLETIN BOARD CONTINUED ON PAGE 629)

# BOOK REVIEWS

**A History of the American Medical Association, 1847-1947.** By Morris Fishbein, M.D., with the Biographies of the Presidents of the Association by Walter L. Bierring, M.D., and with Histories of the Publications, Councils, Bureaus, and Other Official Bodies. 1226 pages. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1947.

It is quite fitting that this really monumental work should have been published just on the eve of the centennial meeting of the American Medical Association. The first 494 pages are devoted to a chronological history of the A.M.A., beginning with its first meeting in Philadelphia, and ending with the resignation of Dr. Olin West as president-elect and the naming of Dr. Edward L. Bortz as his successor.

Forty pages are devoted to the libel suits filed against the A.M.A. at various times by quacks or manufacturers of patent medicines. The total of the amounts sued for is many million dollars, but in the only suit which was lost by the Association, the damage allowed was only one cent! The famous suit brought by the Department of Justice of the United States against the A.M.A. is discussed at some length.

Brief biographies of the recipients of the Distinguished Service Award—first given in 1938 to Dr. Rudolph Matas—are followed by sketches of all the presidents of the American Medical Association. These were prepared by Dr. Walter L. Bierring, who did a splendid job.

The last part of the book deals with the various councils, bureaus and publications of the Association. Each of these is described by the one most familiar with it.

It is impossible, of course, to give more than an outline of such a work as this. Suffice it to say that every member of the American Medical Association should have a copy of it, and should read at least the history of the organization. He can not do so without having increased respect for the greatest medical organization in the world, and for the men who have given so freely and unselfishly of their ability and of their time to its service.

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**Case Studies in the Psychopathology of Crime.** Volume II. By Ben Karpman, M.D., Senior Medical Officer and Psychotherapist, St. Elizabeths Hospital, Washington, D. C. Ed. 2, revised. 738 pages. Washington: Medical Science Press, 1947.

This work represents an attempt to gain an understanding of the problems and circumstances by which children become wayward and criminal. The approach is through the case studies of psychopaths admitted to the St. Elizabeths Hospital. Four such histories are reported. Each is an intensive and intimately detailed personality evaluation utilizing the general history and dreams of the patient.

The author feels that careful analysis plus psychotherapy offers the one fruitful approach to the treatment of the criminal, and the best hope for the solution of the problem of crime. The book is voluminous and is of interest chiefly to those concerned with understanding and treating psychopathic problems. It stresses the importance of the medical aspect of a problem usually considered solely from the legal standpoint. The sale of the book is restricted to those having a direct professional interest in medicolegal and social problems.

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**Advances in Pediatrics, Vol. 2.** Edited by S. Z. Levine, M.D., Allan M. Butler, M.D., L. Emmett Holt, Jr., M.D., and A. Ashley Weech, M.D. 377 pages. Price, $6.75. New York: Interscience Publishers, Inc., 1947.

This volume consists of a series of short monographs on subjects of contemporary pediatric interest. The choice of articles and authors is excellent.

Josef Warkany discusses the etiology of congenital malformations so well that the solved problems become clear to the student, while at the same time he becomes interested in the research which lies ahead. Hattie E. Alexander clearly and comprehensively outlines the method by which the purulent meningitides should be diagnosed and treated. As one might expect, the treatment may rapidly become outmoded. The clinical syndrome of atypical pneumonia is well described by John H. Dingle, who discusses the problems in diagnosis from the pediatrician's point of view. It is an unusually well written article covering a disease of considerable interest to the pediatrician. A. A. Weech's scholarly presentation of the etiology of physiologic jaundice is classic. The clarity of reasoning is exceptional. The problem of the prophylactic use of sulfonamides is of utmost importance in many diseases common in the pediatric age group. Ann Kuttner discusses the **pros** and **cons** authoritatively.

Other subjects equally well presented are the role of fluorine in prevention of dental caries, a review of the pharmacology and chemistry of antibiotic and chemotherapeutic agents, factors determining growth in children, virus diarrhea, and prematurity.

The references alone are worth while. This volume should be read by all who are interested in anything more than the superficial approach to the subjects presented. It is difficult to say whether the student, practitioner, or specialist would find this book more useful. It is hoped that the publishers will put out another similar volume in less time than elapsed between the first two.

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**Gastritis.** By Rudolf Schindler, M.D., F.A.C.P., Clinical Professor of Internal Medicine (Gastroenterology), College of Medical Evangelists, Los Angeles. 470 pages. Price, $8.75. New York: Grune & Stratton, 1947.

This comprehensive monograph represents a clinical discussion of 2500 cases studied by the author, with a correlation of the clinical and gastroscopic observations. The book is divided into a brief introduction, which includes historical data and definitions; a section on classification and gross and microscopic pathology; and a clinical section, which covers pathogenesis, symptomatology, diagnostic methods, treatment, and prognosis. There are many excellent illustrations and the material is thoroughly documented.

The chief problem of explaining the gastroscopic evidence of gastritis often noted in patients without symptoms is not satisfactorily solved and is probably still subject to considerable speculation, as are the other psychosomatic relationships of gastritis. The conclusions are chiefly those of the author, but in view of his experience and many years of investigation on the disease, he is probably justified in drawing his own conclusions.

The book will not end the controversy as to the clinical significance of the high incidence of gastritis reported by many observers, but it is the best monograph on gastritis to date. It is well worth careful study by all physicians interested in gastrointestinal disorders.

**Surgical Pathology.** By William Boyd, M.D., Dipl. Psych., M.R.C.P. Ed., F.R.C.P. Lond., LL.D. Sask., M.D. Oslo, F.R.S.C., Professor of Pathology, The University of Toronto, Canada. Sixth Edition. 858 pages, with 530 illustrations, including 22 color figures. Price, $10.00. Philadelphia and London: W. B. Saunders Company, 1947.

The new edition of this popular book includes the developments in the field since the appearance of the last edition in 1942, as well as some few surgical conditions which were omitted from the earlier book. A new section has been written on the pathology and pathologic physiology of congenital heart disease. Additional material has been added on tumors of the larynx, pinealoma, Bittner's milk factor, fibrositis of the back, fibrous dysplasia of bone, and the Papanicolaou method of diagnosing carcinoma of the cervix. In all of the discussions, the material is handled in the easy-to-read, fluid style which characterizes all of the author's works. Emphasis is placed on the diseases which are more frequently encountered in practice. Less common pathologic entities are mentioned briefly, and references to the recent literature on the subjects are found at the end of each chapter. There is a decided improvement in the grade of paper used in the book, with the result that the many excellent photographs and photomicrographs are reproduced more distinctly in this edition.

Boyd's **Surgical Pathology** is recommended to those who want a readable and well illustrated reference on the subject.

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**The Diagnosis and Treatment of Bronchial Asthma.** By Leslie N. Gay, M.D., Asst. Professor of Medicine, Johns Hopkins University School of Medicine. 334 pages. Price, $5.00. Baltimore: The Williams & Wilkins Company, 1946.

This book contains little that is distinctive, and in certain instances is not in agreement with currently accepted concepts and practices.

The chapter on the pathology of asthma is excellent, and includes a detailed description of autopsy findings on 24 cases of fatal asthma. The psychosomatic aspects of asthma are also particularly well discussed, a feature conspicuously absent in most texts on this subject.

In the section on the causes of asthma, numerous important allergens are omitted. Furthermore, there is no reference to the situations in which the different allergens are encountered—a very important omission where the student is concerned. The role of foods as allergens is belittled. This view is not in accord with the current opinion of the majority of observers.

The author has devoted much space to his own particular interests at the expense of other subjects, some of which are of more importance and interest to the general student.

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**Parergon.** By the American Physicans Art Association. Ed. 3. 208 pages. Price, $5.00. Evansville, Indiana: Mead Johnson & Company, 1947.

**Parergon** represents the work of members of the American Physicians Art Association and "illustrates well over 1,000 examples of original art works by physicians." Etchings, oils, water colors, crayons, pen and ink drawings, pastels, photographs, wood carvings, wood block engravings, and sculpturing are among the types of works represented. This is a collection of great interest, especially to those physicians who are students of the various arts.

**Daniel Coit Gilman, Creator of the American Type of University.** By Abraham Flexner, LL.D. 173 pages. Price, $2.00. New York: Harcourt, Brace and Company, 1946.

The author of this volume of 176 pages, Dr. Abraham Flexner, himself long recognized as a leading educator, outlines the life of Dr. Gilman as an educator.

The description of Dr. Gilman's early years at California and other places is of interest, but the great inspiration comes with the review of his work at Johns Hopkins. Educators, particularly those interested in medical education and the development of a university, will be greatly stimulated by the revelation of courage and determination in these pages.

The book brings together information that has been passed on piecemeal before. It is of value from a historic and a biographical standpoint to have the life and work of Dr. Gilman as an educator in a single volume.

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**Aging Successfully.** By George Lawton, Ph.D. 266 pages. Price, $2.75. New York: Columbia University Press, 1946.

The book is described by the author as "A book for everyone who will ever be 60, and for everyone who is, or has been, 60." The general theme is one of encouragement for people who have a fear of so-called "old age." It suggests a philosophy of life that is inspiring and uplifting. Many of the common problems of aging are discussed and wise solutions are suggested.

This book makes a place for itself among those that have been written on the problems of advancing years. Books of this kind are needed now as never before, since the ever-increasing life span brings to focus increasing life problems.

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# In Memoriam

## C. A. ANDERSON, M.D.

Charles Alexander Anderson was born March 17, 1871, in the Cross Roads section of Alamance County. The region is now part of the Pleasant Grove Section. He was the son of William James Anderson and Elizabeth Holt Anderson, being the ninth of ten children.

His preliminary education was obtained at a local school. Having decided at an early age that he wanted to be a doctor, he went to Baltimore for his professional training. There he received his degree of Doctor of Medicine from the College of Physicians and Surgeons, which school later became a part of the present University or Maryland Medical School. At the time of graduation he felt that he was too youthful in appearance to engage in the practice of his profession, so he deferred practice for a year until he could reach the mature age of 22 years. Then he located in the small village of Carolina, just north of Burlington. After developing a gratifying practice there in the course of some two to three years he moved to Burlington in the year 1895, where, except for periods taken off for study, he practiced the healing art until his death on June 20, 1947.

In the course of these fifty-two years in Burlington two major interests beside medicine claimed him. He had met a delightful and understanding young woman from Windsor, Bertie County of eastern Carolina, who was teaching school in Haw River. She gave up teaching and they were married on October 29, 1914. To them was born a child, Clara Bond Anderson. These two, wife and child, were the two other major interests that with medicine formed the trinity of his Presbyterian make-up. He was interested in church, civic, school and social affairs and in the success of his nephew, Dr. Banks Anderson, but the big three for him were his profession, his wife, and his child.

His interest in things medical was all-absorbing. On several occasions in early professional life he left his practice for periods of months to a year to study in Baltimore and New York. The most extended stay was at the Johns Hopkins Medical School, where he spent approximately a year studying bacteriology. When he had been an undergraduate student of medicine, bacteriology was in its infancy and its teaching had been meager. He had seen only one bacterial slide under a microscope. The thing so intrigued him that some ten years later he stopped practice for a year and went to the new and progressive young Johns Hopkins Medical School to study this emerging science. Upon his return to practice in Burlington he equipped a bacteriologic laboratory in his office and there for his own satisfaction did typhoid and diphtheria cultures, Widal tests, and staining for tubercle bacilli, gonococci, and other organisms. He also did blood sugar determinations, urinalyses, and blood studies. All this was before the days when laboratory facilities were capitalized on. The laboratory would have been recognized as a financial burden if he had ever stopped to think about it, but he was a true scientist in medicine—a student and not a financier. Where other men might rejoice at having purchased a good piece of real estate cheaply, he rejoiced at having found the clue to a diagnosis.

He read omnivorously, then abstracted and indexed the articles that interested him. He bought recent monographs, and marked these with underscorings and marginal notes as carefully as any young undergraduate ever marked his texts for reference in preparing for examination. One of his young confreres said of him: "Dr. Anderson has forgotten more medicine than most doctors ever knew." To that statement can be added the corollary that he also remembered more medicine than most doctors ever remembered.

His mind was not satisfied with the already known. He was constantly exploring the field of the unknown and seeking new and better ways of doing things. His inquiring mind explored many fields and was a constant delight. It did not have to be a profitable field to be explored; sometimes it was a practical matter, sometimes not. He usually persisted until he arrived at a satisfactory conclusion in either event. Why do the dark-skinned races have more body odor than do the light-skinned ones? That was a matter of physics and bacteriology. Medically, the answer to that question may not be important, but there were other questions to which the right answers have been important to the people of this community, state, nation and even of the world. One of his contributions, published in the **Journal of the American Medical Association,** was reprinted in numerous other journals, at least one of which was in another country.

What could be done for tuberculosis and pneumonia? He early recognized the need for oxygen and placed these patients in the open air. Why the development of edema in some chronic nephritics? Was it a matter of salt (electrolyte) imbalance? How could a lone woman give herself a satisfactory hot douche to obtain the benefit of twenty to thirty minutes' heat to the pelvic viscera? His article on this subject was widely recopied. Why do so many people who take mineral oil over a long period of time develop digestive disturbances and pruritus ani? His observations on this question antedated by several years the laboratory determination that mineral oil interferes with the digestive process and with the absorption of some of the vitamins. His solution of the problem by the invention of a syringe for the administration of mineral oil by rectum has been a useful contribution where it is known and used.

The subject of our memorial had one advantage over Hippocrates. He inherited also from that other Healer, the Son of Man, who went about doing good and healing those who were mentally or physically sick. Dr. Anderson was a true follower of the Healing Art—in Spirit and in Truth.

George L. Carrington, M.D.

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## ROBERT ULYSSES ZIMMERMAN, M.D.

### 1875 - 1947

On Saturday morning, August 16, 1947, the communities of Arcadia and Enterprise were stunned by the sudden and unexpected word that "Dr. Bob" was dead. Sad and paralyzing as this news was, it carried with it a typical life-like characteristic of Dr. Bob; he died working. His ability to work and his love for the work in his profession were his most cherished possessions, and he worked unceasingly and unselfishly. Dr. Zimmerman was never too busy to help anyone who came to him sick or in distress.

The life of Dr. Zimmerman needs no man-made eulogy. He made his own eulogy by the way he lived from day to day. For forty-six years he practiced the art of medicine in his home community. The type of his work and his skill as a physician won for him the highest admiration among his host of friends and his professional colleagues.

Dr. Zimmerman was not a scientist. He did not profess to know the latest precepts or to understand the most modern "why or wherefore" of medicine: but he did know that the sick should be treated, the wounded healed, those in pain relieved, and those with trouble and sorrow comforted. To this cause and in this spirit he gave his life and practiced his profession.

Dr. Zimmerman's winning smile, his quick step, his hesitant stammer, and his willingness to serve whenever and wherever called upon will linger with me perhaps long after the memory of any particular illness or any certain patient with whom we labored together has faded into oblivion. His trust and faith were greater than the power of the surgeon's knife to remove or the pharmacist's medicine to cure. This trust and faith so radiated from him that his patients were made to feel secure and unafraid when in his care.

His life was busy, his manner quiet, his spirit unafraid. As he toiled in his meek and humble way in life, so he met death and that undiscovered world beyond from whose bourne no traveler returns—quietly, unassuming, working unafraid; and without struggle, cry or pain he laid down the tools of the beloved physician here below, to take up the tools of the Master's craft above.

J. R. Bender, M.D.

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Read before the Davidson County Medical Society, Lexington, September 3, 1947.

NORTH CAROLINA MEDICAL SOCIETY
GROUP ACCIDENT AND HEALTH PLAN

Doctors Become Disabled Too!!

$200,000.00

We have paid this sum to disabled members of the North Carolina Medical Society. They tell us it has been good medicine.

Disability may strike you without warning. If you are not already insured under this Plan, that has the full acceptance and endorsement of your Society, write for particulars today.

*Approved by your Society for your benefit in 1940.*

▼

J. L. CRUMPTON

**Post Office Box 147** **DURHAM, N. C.**

*—Representing—*

COMMERCIAL CASUALTY INSURANCE COMPANY

**NEWARK, NEW JERSEY**

# TRANSACTIONS OF THE AUXILIARY to the Medical Society of the State of North Carolina

## TWENTY-FOURTH ANNUAL SESSION

## Held at Virginia Beach, Virginia, May 13, 1947

### OFFICERS 1946-1947

| | |
|---|---|
| President | Mrs. Frederick R. Taylor, High Point |
| President-Elect | Mrs. W. Reece Berryhill, Chapel Hill |
| First Vice President and Chairman of Organization | Mrs. Erick Bell, Wilson |
| Second Vice President and Chairman of Activities | Mrs. B. Watson Roberts, Durham |
| Chairman of Student Loan Fund | Mrs. F. Norman Bowles, Durham |
| Chairman of McCain Bed | Mrs. William P. Richardson, Chapel Hill |
| Chairman of Stevens Bed | Mrs. G. M. Billings, Morganton |
| Chairman of Cooper Bed | Mrs. M. I. Fleming, Rocky Mount |
| Chairman of Past Presidents | Mrs. P. P. McCain, Sanatorium |
| Corresponding Secretary | Mrs. C. L. Gray, High Point |
| Recording Secretary | Mrs. Charles H. Gay, Charlotte |
| Treasurer | Mrs. E. C. Judd, Raleigh |
| Advisory Board Chairman | Dr. Rachel Davis, Kinston |
| N. C. Councilor to Southern Medical Auxiliary | Mrs. Clyde R. Hedrick, Lenoir |

### STANDING COMMITTEES 1946-1947

| | |
|---|---|
| Program | Mrs. M. D. Hill, Raleigh |
| Public Relations | Mrs. John P. Kennedy, Charlotte |
| Legislative | Mrs. C. P. Eldridge, Raleigh |
| Press and Publicity | Mrs. S. S. Saunders, High Point |
| Bulletin | Mrs. Wingate M. Johnson, Winston-Salem |
| Hygeia | Mrs. D. M. Royal, Salemburg |
| Memorials | Mrs. Ira C. Long, Goldsboro |
| Historian | Mrs. Herbert H. Ogburn, Greensboro |
| Research | Mrs. Joseph A. Elliott, Charlotte |
| Scrapbook | Mrs. R. A. Moore, Winston-Salem |
| Jane Todd Crawford Memorial | Mrs. C. S. Barker, New Bern |
| Post War Planning | Mrs. K. B. Pace, Greenville |
| Doctors' Day | Mrs. John C. McLain, Dunn |
| Revisions | Mrs. J. Buren Sidbury, Wilmington |
| Nominations | Mrs. Robert L. McMillan, Winston-Salem |

### COUNCILORS

| | |
|---|---|
| First District | Mrs. Carlton A. Davenport, Hertford |
| Second District | Mrs. Thomas L. Lee, Kinston |
| Third District | Mrs. E. P. Walker, Wilmington |
| Fourth District | Mrs. George W. Mitchell, Wilson |
| Fifth District | Mrs. A. L. O'Briant, Raeford |
| Sixth District | Mrs. W. T. Ward, Raleigh |
| Seventh District | Mrs. W. M. Summerville, Charlotte |
| Eighth District | Mrs. Harry L. Johnson, Elkin |
| Ninth District | Mrs. Alfred A. Kent, Jr., Granite Falls |
| Tenth District | Mrs. S. M. Bittinger, Black Mountain |

### PAST PRESIDENTS

| | |
|---|---|
| 1923 (Organizing Chairman) | Mrs. P. P. McCain, Sanatorium |
| 1924 | Mrs. P. P. McCain, Sanatorium |
| 1925 | Mrs. I. W. Faison, Charlotte |
| 1926 | Mrs. J. Howell Way, Waynesville |
| 1927 | Mrs. R. S. McGeachy, Kinston |
| 1928 | Mrs. B. J. Lawrence, Raleigh |
| 1929 | Mrs. A. B. Holmes, Fairmont |
| 1930 | Mrs. J. H. Macon, Warrenton |
| 1931 | Mrs. W. B. Murphy, Snow Hill |
| 1932 | Mrs. R. S. McGeachy, Greenville |
| 1933 | Mrs. W. P. Knight, Greensboro |
| 1934 | Mrs. J. W. Huston, Asheville |
| 1935 | Mrs. J. Buren Sidbury, Raleigh |
| 1936 | Mrs. C. P. Eldridge, Raleigh |
| 1937 | Mrs. J. R. Terry, Lexington |
| 1938 | Mrs. W. T. Rainey, Fayetteville |
| 1939 | Mrs. Joseph A. Elliott, Charlotte |
| 1940 | Mrs. C. F. Strosnider, Goldsboro |
| 1941 | Mrs. Clyde R. Hedrick, Lenoir |
| 1942 | Mrs. Sidney Smith, Raleigh |
| 1943 | Mrs. R. A. Moore, Winston-Salem |
| 1944 | Mrs. K. B. Pace, Greenville |
| 1945 | Mrs. J. T. Saunders, Asheville |
| 1946 | Mrs. Erick Bell, Wilson |

### CONVENTION PROGRAM

Auxiliary General Co-Chairman of Convention
—Mrs. M. D. Hill
Mrs. Ben Lawrence

#### MONDAY, May 12

8:30 p.m.—Bridge and Prizes

#### TUESDAY, May 13

9:00 a.m.—Executive Board Meeting

11:00 a.m.—Annual Meeting

4:00 p.m.—Reception honoring Mrs. Frederick R. Taylor, president; Mrs. William M. Coppridge, wife of president of Medical Society; Mrs. Roscoe D. McMillan, wife of secretary-treasurer of Medical Society; Mrs. W. Reece Berryhill, president-elect; Mrs. Frank A. Sharpe, wife of president-elect of Medical Society; Mrs. Stuart Willis, wife of Superintendent of the State Sanatoria; and other guests of the Society.

7:00 p.m.—Banquet

10:00 p.m.—Annual Ball

#### WEDNESDAY, May 14

10:30 a.m.—Coca-Cola Hour

## PRE-CONVENTION MEETING OF THE EXECUTIVE BOARD

Tuesday, May 13

### Minutes

The Executive Board of the Auxiliary to the Medical Society of the State of North Carolina met in the Hunt Room of the Cavalier Hotel, Virginia Beach, Virginia, May 13, 1947, at 9:00 a.m. with Mrs. Frederick R. Taylor, the president, in the chair.

Mrs. Taylor gave the invocation, followed by greetings and words of welcome to the Board members and expressions of gratitude for the cooperation shown by everyone during the year.

The roll call, showing 17 members present, was followed by the reading and approval of minutes of the last Board Meeting.

Mrs. P. P. McCain, chairman of past presidents, had no report.

The president-elect, Mrs. W. Reece Berryhill, expressed personal satisfaction in having had a year of apprenticeship under our president, Mrs. Taylor, as well as keen anticipation for the year ahead that it might bring interesting work and profitable accomplishments.

Mrs. Erick Bell, first vice president and chairman of organization, gave her report, which was accepted and filed.

Mrs. B. Watson Roberts, second vice president and chairman of activities, was absent but sent her report, which was filed.

The recording secretary, Mrs. Charles H. Gay, reported all minutes compiled and copies mailed to all Board members.

The report of Mrs. C. L. Gray, corresponding secretary, was heard and filed.

Mrs. William P. Richardson, chairman of the McCain Bed, read her report, which was filed.

The chairman of the Stevens Bed, Mrs. G. M. Billings, read and filed her report.

The report of Mrs. M. I. Fleming, chairman of the Cooper Bed, was read and filed.

The chairman of the Student Loan Fund, Mrs. F. Norman Bowles, was absent, but sent her report, which was filed.

The district councilors were introduced by Mrs. Erick Bell, and they, in turn, gave reports:

First District, Mrs. Carlton A. Davenport—Absent, no report.

Second District, Mrs. Thomas Leslie Lee—Report read and filed.

Third District, Mrs. E. P. Walker—Absent, no report.

Fourth District, Mrs. George W. Mitchell—Report read and filed.

Fifth District, Mrs. A. L. O'Briant—Absent, no report.

Sixth District, Mrs. W. T. Ward—Absent, report read and filed.

Seventh District, Mrs. W. M. Summerville—Report filed.

Eighth District, Mrs. Harry L. Johnson—Report read and filed.

Ninth District, Mrs. Alfred A. Kent, Jr.—Absent, report submitted and filed.

Tenth District, Mrs. S. M. Bittinger—Absent, no report.

It was moved and seconded that all reports be accepted and incorporated in the transactions.

The reports of standing committees followed:

Program, Mrs. M. D. Hill—Report heard and filed.

Public Relations, Mrs. John P. Kennedy—Report read and filed.

Legislative, Mrs. C. P. Eldridge—Absent, no report.

Press and Publicity, Mrs. S. S. Saunders—Absent, report read and filed.

Research, Mrs. Joseph A. Elliott—Absent. Mrs. Elliott sent copies of the history of the lives of the late Drs. E. C. Judd and David A. Stanton.

**Hygeia**, Mrs. D. M. Royal—Absent, report filed.

**Bulletin**—Mrs. Wingate M. Johnson reported forty-five **Bulletin** subscriptions for the year.

Scrapbook, Mrs. R. A. Moore—Absent, report filed.

Historian, Mrs. Herbert H. Ogburn—Absent, report read and filed.

Post War Planning, Mrs. K. B. Pace—Report read. Mrs. Pace suggested that the incoming officers determine the need for continuing this committee. Mrs. Taylor asked that this be read as a recommendation from the Board before the General Session.

Doctors' Day, Mrs. John G. McLain—Absent, no report.

Jane Todd Crawford Memorial, Mrs. C. S. Barker—Absent, report read and filed.

Advisory Board Chairman, Dr. Rachel Davis—Report delayed for General Meeting.

Councilor to Southern Medical Auxiliary, Mrs. Clyde R. Hedrick—Absent, report read.

Revisions, Mrs. J. Buren Sidbury—Absent, no report.

Memorials, Mrs. Ira C. Long. Mrs. Long was absent but sent a Memorial Service which was held for reading before the General Session.

Mrs. Taylor inquired as to the advisability and need for a full-time secretary-treasurer, since the responsibility of these offices becomes increasingly heavy. After some discussion, it was agreed that the matter be referred to Mrs. Berryhill, the incoming president, for study, with the help of an appointed committee.

Board members were reminded of the Centennial Anniversary Convention of the American Medical Association, to be held in Atlantic City in June.

Mrs. E. C. Judd, treasurer, was absent, but sent her report, which was read by Mrs. M. D. Hill. This report was accepted and filed. It was moved and seconded that a letter be written to Mrs. Judd expressing grateful appreciation for her exceptionally fine and untiring efforts in compiling and presenting this detailed report each year. This was also to express regret that her absence from the meeting was necessary.

It was moved by Mrs. Hill and seconded by Mrs. Fleming that the Auxiliary pay for the material and printing of the "Year Books". This motion was approved.

There being no further business, the Board adjourned to meet with the General Session.

Respectfully submitted,
MRS. CHARLES H. GAY,
Recording Secretary

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## GENERAL SESSION

Tuesday, May 13

### Minutes

The Auxiliary to the Medical Society of the State of North Carolina held its twenty-fourth annual meeting Tuesday, May 13, 1947, at 11:00 o'clock in the Hunt Room of the Cavalier Hotel, Virginia Beach, Virginia, with Mrs. Frederick R. Taylor, president, presiding.

The meeting was opened with an invocation led by Mrs. Wingate Johnson, and followed by words of welcome from the president.

Mrs. Taylor introduced Dr. William Coppridge, president of the State Medical Society, who commended the Auxiliary very highly for its fine support of the Medical Society. Dr. Coppridge spoke interestingly and informatively of the accomplishments and ideals of the Medical Society. He considered the passage of the North Carolina Health Bill a definite step forward in medical progress in our state. He stressed the need for training of Negro doctors in North Carolina, and added that this matter was being studied extensively. In addition, Dr. Coppridge mentioned other legislative topics which are under consideration. The nursing shortage continues to be a definite problem, and the training of practical nurses appears to be the most logical attempt to alleviate the situation. The need for improvement of public relations, according to Dr. Coppridge, presents an opportunity for each Auxiliary member to exert a helpful influence; and he also urged our continued assistance to hospitals. He requested the Auxiliary to aid in influencing young people to enter various phases of medical service for training. Dr. Coppridge anticipated the establishment of a Bureau of Information at Chapel Hill which would offer assistance to those interested in preparing for this type of work. In conclusion, he explained briefly the need for an expansion of the Executive Board of the State Medical Society, This, in effect, would provide a layman as an executive secretary, who would appear before as many groups as possible, thus strengthening public relations in behalf of the medical profession.

Mrs. Taylor expressed the gratitude of the entire group when she thanked Dr. Coppridge for a most enlightening talk and for his time shared with the Auxiliary.

Special guests introduced by the president included Mrs. Roscoe D. McMillan, wife of the secretary-treasurer of the Medical Society, and Mrs. Stuart Willis, wife of the Superintendent of the North Carolina Sanatoria.

At this time, the usual order of business was altered to facilitate matters for some of those participating.

Mrs. Berryhill was presented as the incoming president and the slate of officers was read by the secretary, in the absence of Mrs. Robert McMillan, chairman of nominations. Mrs. M. D. Hill moved, and Mrs. Harry Johnson seconded the motion, that the slate be accepted. These officers were unanimously elected for the coming year and were installed with inspiring remarks by Dr. Rachel Davis, who sincerely requested for these officers the cooperation of each Auxiliary member.

Dr. Davis, as chairman of the Advisory Board, brought to the group an earnest appeal for a continuation of the Auxiliary's support of the Medical Society, especially from the standpoint of public relations.

Mrs. Taylor read a letter from Mrs. Jesse D. Hamer, president of the National Auxiliary, expressing regret in being unable to attend our meeting.

The entire group stood while a memorial service, prepared by Mrs. Ira C. Long in memory of Mrs. R. S. McGeachy and Mrs. Frank H. Garris, was read by Mrs. Rigdon Dees. Mrs. Taylor read and explained a letter from Mrs. C. S. Barker, chairman of the Jane Todd Crawford Memorial Fund, asking that a donation be taken for this fund as a memorial to Mrs. R. S. McGeachy, who was chairman of the fund at the time of her death. It was agreed that this be done and that a copy of the memorial service be sent to Robert McGeachy, only son of the late Dr. and Mrs. McGeachy.

The district councilors were introduced by Mrs. Bell, first vice president; and the councilors, in turn, introduced to the group their county presidents. These reports were heard.

Mrs. B. W. Roberts, second vice president and chairman of activities, was absent because of illness, but sent her report.

The following chairmen gave their reports, which were filed:

Mrs. William P. Richardson, chairman of McCain Bed
Mrs. G. M. Billings, chairman of Stevens Bed
Mrs. M. I. Fleming, chairman of Cooper Bed.

Mrs. Bell took the chair and Mrs. Taylor, as president, gave her report, which was accepted. Mrs. Bell asked for a rising vote of thanks in gratitude to Mrs. Taylor.

In the absence of Mrs. Clyde R. Hedrick, councilor to the Southern Medical Auxiliary, her report was read by Mrs. Ralph E. Lore.

Mrs. John Kennedy, as delegate to the American Medical Association Auxiliary Meeting held in San Francisco in 1946, reported a most interesting time.

Delegates elected to the National Meeting to be held in Atlantic City were as follows:

Mrs. Grady Dixon, Ayden
Mrs. Norman Fox, Guilford College
Mrs. Frank Sharpe, Greensboro
Mrs. W. P. Richardson, Chapel Hill
Mrs. Roscoe McMillan, Red Springs
Mrs. John C. Tayloe, Washington, N. C.
Mrs. Charles Powell, Goldsboro
Mrs. J. R. Lowery, Salisbury
Mrs. A. C. Bulla, Raleigh

Alternates elected were:

Mrs. H. C. Lennon, Greensboro
Mrs. M. I. Fleming, Rocky Mount

Mrs. John P. Kennedy announced the following awards, which were presented to the winners by Mrs. M. D. Hill:

$5.00 (donated by Mrs. F. R. Taylor) to Hoke County for 100 per cent membership.

$5.00 (donated by Mrs. P. P. McCain) to Guilford County for largest contribution to P. P. McCain Endowment Fund.

$5.00 (donated by Mrs. G. M. Billings) to Buncombe County for largest contribution to Martin L. Stevens Endowment Fund.

$5.00 (donated by Mrs. M. D. Hill) to Nash-Edgecombe County for largest contribution to George Cooper Endowment Fund.

$5.00 (donated by Mrs. B. W. Roberts) to Guilford County for largest contribution to Student Loan Fund.

The Davis Cup and $25.00 (donated by Dr. Rachel Davis) to the Eighth District as an award of excellence and achievement. The Fourth District was honorably mentioned.

Mrs. Roscoe McMillan suggested that doctors' widows be made honorary members of the Auxiliary rather than members-at-large, as is now provided in the By-Laws. It was agreed that this suggestion be referred to the Revision Committee.

Mrs. Paul Yoder asked if letters could be written to all absent past-presidents, telling them that they were missed at our meeting. This suggestion was approved, and the secretary was so instructed.

A recommendation from the Board that the incoming officers determine the need for continuing the Post War Planning Committee was read by the secretary.

Mrs. Taylor expressed grateful appreciation to Mrs. M. D. Hill and Mrs. Ben Lawrence, who served as our hospitality committee, and who, with the help of Dr. Roscoe McMillan, formulated plans and assisted greatly in making our stay at Virginia Beach more pleasant.

Mrs. Taylor presented the gavel to Mrs. Berryhill, who made inaugural remarks which were inspiring as well as challenging.

There being no further business to come before the Auxiliary, the meeting was adjourned.

Respectfully submitted,
MRS. CHARLES H. GAY,
Recording Secretary

### Report of the President

Believing that power without service is ruinous, we adopted as our Auxiliary motto, "Service to Others."

We also believe that Victor Hugo uttered a great truth when he said, "There is nothing in this world so powerful as an idea whose time has come."

We began the year feeling that the idea for which we were originally organized, to foster friendliness among the families of physicians, should be stressed more than ever, as the time to accomplish this seems to be peculiarly ripe.

This has been a year of splendid cooperation and friendliness. I am deeply grateful for the fine contacts I have been privileged to make as your president, and for the opportunity of serving you. However, along with the joy has come deep sadness because of the loved ones who have been removed from our midst: Mrs. R. S. McGeachy ("Aunt Het" to most of us), one of our own number; Dr. P. P. McCain, beloved husband of one of our past presidents and a friend to all of us; and many others have been called from works to rewards. Like the old colored man who said "The Lord knows our carrying power," we have accepted the inevitable and carried on to the best of our ability.

It is through your efforts that we are able to report a good year in all our activities—educational, philanthropic, legislative, social, and a special effort to complete the McCain Endowment Fund as a living memorial to Dr. Paul P. McCain.

We made a special attempt to secure every eligible doctor's wife as a member of our organization. In this we have failed. However, we have 82 more members to report to National Auxiliary than last year.

We are grateful to Dr. Frederick R. Taylor for designing a seal for the cover of our year book. This was adopted as our permanent emblem at our fall Board Meeting.

I will not reiterate the work done by each member of our Executive Board and all our county presidents, as their reports have been read and will appear in the transactions.

Your president regrets that she was unable to attend all the meetings to which she was invited. However, she did attend three district meetings, a Wake County meeting, the symposium conducted by the Watts Hospital Staff (where she conferred with President Coppridge and two of our Advisory Committee), the fall Board Meeting at the home of Dr. and Mrs. P. P. McCain, and the Christmas dinner party given by the Winston-Salem Auxiliary. She spoke to a P.T.A. group on health problems and "Our Family Is Our Fortune." Also she has written several hundred letters in the interest of our Auxiliary work, and has tried to perform all her presidential duties faithfully.

I do want to take this opportunity to thank each of you for your fine work and your willingness to devote your time and talents in making this a good year for our organization. I ask your continued support and cooperation for our incoming officers, especially our very capable and efficient new president, Mrs. W. Reece Berryhill.

May we look ahead to a year of greater service to others with the simple philosophy of Ella Wheeler Wilcox:

So many faiths, so many creeds,
So many paths that wind and wind,
When the only thing this sad world needs
Is just the art of being kind.

"The only limit to our realization of tomorrow will be our doubts of today. Let us move forward with strong and active faith." (Franklin Delano Roosevelt).

Respectfully submitted,
MRS. F. R. TAYLOR

### Report of the First Vice President and Chairman of Organization

As organization chairman of the Auxiliary to the Medical Society of the State of North Carolina, I wish to submit the following report for 1946-47:

This general report will be supplemented by detailed reports from the ten councilors, who make up the Committee on Organization.

All correspondence and requests were answered promptly.

In September letters were written to each councilor, urging an "early start" and intensified efforts toward organization. Instructions and copies of two form letters which might be used in soliciting the cooperation of county medical societies were enclosed in these letters.

In March letters and questionnaires were sent to councilors in order to ascertain work accomplished in the various districts. These reports showed that your councilors have been most active. A number of counties reported 100 per cent paid membership, an increase in **Hygeia** and **Bulletin** subscriptions, observance of Doctors' Day, generous contributions to the various funds, especially to the McCain Endowment, as well as many hours contributed to various local projects and drives.

In March, at the request of the president, your chairman prepared an article for the **North Carolina Medical Journal** on organization and membership.

To date there are thirty organized counties, totalling a membership of 900. No doubt this number will be increased before this report goes to press.*

There were great hopes of forming a number of new auxiliaries this year; but, though efforts were made, this report carries no increase. However, the Eighth District—Mrs. Harry L. Johnson, councilor—is in the process of organizing Surry-Yadkin-Wilkes-Alleghany counties with the hope of completing this work before the annual meeting. Congratulations to the Eighth District! It is also heartening to see renewed interest evidenced in the First District—Mrs. Davenport, councilor—and in Burke County of the Ninth District—Mrs. Alfred A. Kent, councilor.

At the request of Mrs. John P. Helmick, fourth vice president of the National Auxiliary, your chairman agreed to serve with her on the National Board on a sub-committee of three from the Southern District under the general chairman, Mrs. David Allman, first vice president of the National Auxiliary. The other two members were organization chairmen from Oklahoma and Mississippi. Each of these had four states under her supervision. Grouped with North Carolina were South Carolina, Georgia, and Kentucky. In compiling reports for the National Auxiliary I was gratified to note that North Carolina compared favorably with other states, surpassing them in number of organized units and membership.

Sincere thanks to our splendid president, the Board members, and each councilor for the cooperation and work which has made this report possible.

MRS. ERICK BELL

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* It was increased to 1004.

### Report of the Second Vice President and Chairman of Activities

As chairman of activities I have the privilege of making the combined report for the four chairmen of our projects—namely, the McCain, the Stevens and the Cooper Beds, and the Student Loan Fund.

After the death in November of our beloved Dr. P. P. McCain, we decided at the suggestion of our president, Mrs. F. R. Taylor, that our Auxiliary aim for the year would be to complete the Endowment Fund for the McCain Bed as a living memorial to Dr. McCain. Ten thousand dollars was needed, so Mrs. W. P. Richardson, McCain Bed chairman, set to work to inform all the branches of this project and to urge their full cooperation. The response was very gratifying, but as we reach Annual Meeting time the full amount is not yet in hand. The North Carolina Medical Society gave a sizable donation, and Dr. W. M. Coppridge, president, has appointed a committee to solicit individual contributions from doctors who would like to give and have not had an opportunity, so we hope to have the full amount in a short time.

Mrs. Richardson reports that Miss Florence Matthews, the guest of the McCain Bed since September, 1943, was discharged in December, 1946. She greatly appreciated all the kind things done for her while she was our guest. Mrs. Richardson has been our means of contact with Miss Matthews. Miss Lena May Aman has now taken Miss Matthews' place. She is from Jacksonville, North Carolina, a graduate of James Walker Memorial Hospital School of Nursing, Wilmington, North Carolina.

Mrs. G. M. Billings, chairman of the Stevens Bed, reports that Miss Alice Louise Stamey has been discharged and Miss Liselotte Schumann is now the occupant of the Stevens Bed.

The Cooper Bed is our youngest project. Mrs. M. I. Fleming is chairman. Mrs. Eleana M. Sutton is using the bed at present. She is a former floor supervisor of Park View Hospital. She has been with us since last October.

Mrs. F. Norman Bowles, Student Loan Fund chairman, reports that the fund is intact and that very little has been contributed this year, as the emphasis has been on the McCain Endowment Fund.

We are fortunate to have such fine and interested chairmen to carry on this most worthwhile part of the Auxiliary's work.

The financial report will be given in full by Mrs. Judd.

Respectfully submitted,
MRS. B. WATSON ROBERTS

### McCain Bed Chairman

Miss Florence Matthews, the nurse from Autryville who was the guest of the Auxiliary in the McCain Bed from September, 1943, was discharged in December, 1946. She is sufficiently recovered to do limited nursing, and has been given a part-time job at the Black Mountain Sanatorium, where she can continue under close supervision. She is very grateful to the Auxiliary for the many courtesies extended her during her stay, and has asked me to extend to you her deep appreciation.

Following Miss Matthews' discharge, sanatorium authorities were asked to suggest another guest from among the patients there. Upon their recommendation, Miss Lena May Aman of Jacksonville was chosen. Miss Aman is a graduate of James Walker Memorial Hospital School of Nursing, class of 1940. Following graduation she did general duty nursing in Salisbury. Later she was employed at Lee Memorial Hospital, Norfolk, Virginia, where she was working when the diagnosis of tuberculosis was made.

I have visited Miss Aman. She is a very attractive young lady, and most appreciative of being our guest. I hope you will remember her as often as possible with letters and gifts, and that if you ever visit the sanatorium you will go to see her.

As all of you know, in December we lost our beloved Dr. McCain, who devoted his life to combatting tuberculosis. Immediately after his death a number of people sent checks to Mrs. Judd or myself for the McCain Endowment Fund, taking this method of paying tribute to his memory.

Then our president, Mrs. Taylor, conceived the idea that there was no finer way in which the Auxiliary could express its love and respect for Dr. McCain and our sense of loss at his death than to try to secure the balance needed to complete the $10,000 Endowment Fund as a living memorial to him. Letters were sent to all auxiliaries, telling them of this plan, and the response has been most gratifying.

Mrs. Taylor also approached the Executive Committee of the Medical Society, and they voted to have a committee appointed to solicit donations to a McCain Memorial Fund. This fund will be applied first to complete our Endowment Fund, and if there is sufficient money left, a portrait or bust of Dr. McCain will be placed in the Sanatorium. The committee has gotten out a letter to each member of the Society. The response is not yet complete, but we hope the Fund will go "over the top" before the end of this meeting.

I should like to express my genuine appreciation to Mrs. Taylor for her inspiration, enthusiasm, and support of this undertaking. I would like also to thank Mrs. Judd for her capable handling of the added work that has been involved, and to thank all the individuals and auxiliary chapters who have made contributions.

Respectfully submitted,
MRS. W. P. RICHARDSON

### Stevens Bed Chairman

Last fall I wrote the Sanatorium asking Miss Stamey's needs. Finding she needed pajamas, we sent two pairs. We also remembered her on holidays with cards and gifts.

At Christmas the ladies of Burke County responded beautifully, and we sent a nice box of gifts—hose, a slip, stationery, stamps, a bracelet, a blouse, handkerchiefs, powder, and candy. We sent her a check for $37.50. She had been in bed three years and was in need of clothes. Any patient at the Sanatorium needs a little ready cash for necessities.

Since Christmas, Miss Stamey has gone home, and a former nurse, Miss Liselotte Schumann, occupies the Stevens Bed. I have written to learn of her needs, but have not heard yet.

I sent Mrs. Judd the Burke County dues, and $14.00 of that goes to the Stevens Bed. Mrs. Stevens sent a check for a thousand dollars, and I also sent donations amounting to forty-six dollars. I have reason to believe that more will come in later.

Respectfully submitted,
MRS. G. M. BILLINGS

### Cooper Bed Chairman

The Cooper Bed is now occupied by Mrs. Eleana M. Sutton, a brunette about 35 years of age. For ten years or more prior to her illness, she was floor supervisor at Park View Hospital. She has one child, a daughter about 13 years of age. Mrs. Sutton has shown marked improvement since her entrance to the sanatorium as our guest last October, shortly after approval of her application at the district meeting at Sanatorium. As president of the Edgecombe-Nash Auxiliary, I appointed Mrs. John G. Smith as chairman of a visiting committee; and for the past year our guest has been visited one or more times during each month by two or more of the doctors' wives. She has been sent, from different auxiliaries, several years' subscriptions to magazines. These have helped her pass many hours pleasantly. At Christmas she was showered with many useful gifts.

I am glad to report that Mrs. Sutton is making splendid progress and greatly appreciates everything that is being done for her.

Respectfully submitted,
MRS. M. I. FLEMING

**Student Loan Fund Chairman**

No requests for loans have been made during 1947. All former loans have been paid, leaving the Student Loan Fund with a clean slate.

Respectfully submitted,
MRS. F. NORMAN BOWLES

**Report of the Treasurer**

I submit my report of the treasurer's records for the year 1946-1947. All accounts have been recorded and disbursed according to the By-Laws.

Mrs. Frederick R. Taylor has been a most efficient and untiring president. She has put the paid membership for this year beyond the thousand mark, and from the financial viewpoint my records show substantial gains, especially in the three endowment funds.

I thank Mrs. Taylor, members of the Executive Board, and county auxiliary presidents and treasurers for their wonderful cooperation.

The auditor's report covering in detail the activities of the treasurer's office for the past year is herewith appended.

Respectfully submitted,
MRS. E. C. JUDD

**Auditor's Report**

**Exhibit A**

**Statement of Assets and Liabilities**
**As of June 30, 1947**

| *Assets* | *Total* | *General Expense Fund* | *District Achievement Prize Fund* | *Sanatoria Bed Fund* | *Martin L. Stevens Endowment Fund* | *McCain Endowment Fund* | *Student Loan Fund* | *George M. Cooper Endowment Fund* |
|---|---|---|---|---|---|---|---|---|
| Cash in Bank (Exhibit B) | $ 3,228.11 | $242.04 | $25.00 | $409.55 | $ 814.38 | $ 695.77 | $ 673.83 | $ 367.54 |
| Investments: (Cost Price) | | | | | | | | |
| U.S. Defense Savings Bonds of 10-1-41—Series F. Mature 12 years from date. Maturity value $2,800.00 | 2,072.00 | — | — | — | — | 2,072.00 | — | — |
| U.S. War Savings Bonds of 6-1-43—Series F. Mature 12 years from date. Maturity value $1,500.00 | 1,110.00 | — | — | — | — | 1,110.00 | — | — |
| U.S. War Savings Bonds of 6-1-44—Series F. Mature 12 years from date. Maturity value $500.00 | 370.00 | — | — | — | — | 370.00 | — | — |
| U.S. War Savings Bonds of 9-1-43—Series F. Mature 12 years from date. Maturity value $325.00 | 240.50 | — | — | — | 240.50 | — | — | — |
| U.S. War Savings Bonds of 4-1-45 — Series G. 2½% payable semi-annually | 1,000.00 | — | — | — | 1,000.00 | — | — | — |
| U.S. War Savings Bonds of 6-14-45 — Series F. Mature 12 years from date. Maturity value $500.00 | 370.00 | — | — | — | — | 370.00 | — | — |
| U.S. War Savings Bonds of 6-30-45 — Series F. Mature 12 years from date. Maturity value $1,000.00 | 740.00 | — | — | — | — | — | 740.00 | — |
| U.S. War Savings Bonds of 6-1-47 — Series G. 2½% payable semi-annually | 1,000.00 | — | — | — | 1,000.00 | — | — | — |
| U.S. War Savings Bonds of 6-1-47—Series F. Mature 12 years from date. Maturity value $3,500.00 | 2,590.00 | — | — | — | — | 1,850.00 | — | 740.00 |
| TOTAL ASSETS | $12,720.61 | $242.04 | $25.00 | $409.55 | $3,054.88 | $6,467.77 | $1,413.83 | $1,107.54 |
| Surplus | $12,720.61 | $242.04 | $25.00 | $409.55 | $3,054.88 | $6,467.77 | $1,413.83 | $1,107.54 |
| TOTAL SURPLUS | $12,720.61 | $242.04 | $25.00 | $409.55 | $3,054.88 | $6,467.77 | $1,413.83 | $1,107.54 |

## Exhibit B

### Summary of Cash Receipts and Disbursements
### For the Period from July 1, 1946 to June 30, 1947

| | *Cash Balance 7-1-46* | *Receipts* | *Disbursements* | *Cash Balance 6-30-47* |
|---|---|---|---|---|
| General Expense Fund—Schedule B-1 | $ 250.19 | $ 502.00 | $ 510.15 | $ 242.04 |
| District Achievement Prize Fund—Schedule B-2 | 50.00 | — | 25.00 | 25.00 |
| Sanatoria Bed Fund—Schedule B-3 | 657.43 | 687.00 | 934.88 | 409.55 |
| Total Wachovia General Checking Account | $ 957.62 | $1,189.00 | $1,470.03 | $ 676.59 |
| Martin L. Stevens Endowment Fund—Schedule B-4 (Wachovia Savings Account) | 564.92 | 1,249.94 | 1,000.48 | 814.38 |
| McCain Endowment Fund—Schedule B-5 (Wachovia Savings Account) | 514.78 | 2,031.44 | 1,850.45 | 695.77 |
| Student Loan Fund—Schedule B-6 (Wachovia Savings Account) | 644.69 | 29.73 | .59 | 673.83 |
| George M. Cooper Endowment Fund—Schedule B-7 (Wachovia Savings Account) | 730.00 | 378.08 | 740.54 | 367.54 |
| TOTAL ALL FUNDS (To Exhibit A) | $3,412.01 | $4,878.19 | $5,062.09 | $3,228.11 |

### Schedule B-1

### General Expense Fund

Receipts and Disbursements
For Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance on Deposit—July 1, 1946 | | $ 250.19 |
| **Receipts:** | | |
| Dues 1946-47 (1,004 members @ $1.00) ½ to Sanatoria Bed Fund | | 502.00 |
| | | $ 752.19 |
| **Disbursements:** | | |
| Auditing Fee | $ 45.00 | |
| Postage, Telephone and Other Office Expense | 210.55 | |
| Safety Deposit Box Rent | 3.60 | |
| Mrs. Harold F. Wahlquist, National Treasurer, (Dues 1,004 members @ .25) | 251.00 | 510.15 |
| Balance on Deposit—June 30, 1947 (To Exhibit B) | | $ 242.04 |

### Schedule B-2

### District Achievement Prize Fund

Receipts and Disbursements
For Period from July 1, 1946 to June 30, 1947

| | |
|---|---|
| Balance on Deposit—July 1, 1946 | $ 50.00 |
| Receipts | — |
| | $ 50.00 |
| **Disbursements:** | |
| District Achievement Prize | 25.00 |
| Balance on Deposit—June 30, 1947 | $ 25.00 |

### Schedule B-3

### Sanatoria Bed Fund

Receipts and Disbursements
For the Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance on Deposit—July 1, 1946 | | $ 657.43 |
| **Receipts:** | | |
| Contributions | $ 185.00 | |
| Dues—1946-47 (1,004 members @ $1.00) ½ to General Fund | 502.00 | 687.00 |
| | | $1,344.43 |
| **Disbursements:** | | |
| N. C. Sanatorium | $ 185.10 | |
| W. N. C. Sanatorium | 231.12 | |
| E. N. C. Sanatorium | 109.13 | 525.35 |
| | | $ 819.08 |
| Transfer to following funds: | | |
| McCain Endowment Fund | $ 136.51 | |
| Martin L. Stevens Endowment Fund | 136.51 | |
| George M. Cooper Endowment Fund | 136.51 | 409.53 |
| Balance on Deposit—June 30, 1947 | | $ 409.55 |

### Schedule B-4

### Martin L. Stevens Endowment Fund

Receipts and Disbursements
For the Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance in Savings Account—July 1, 1946 | | $ 564.92 |
| **Receipts:** | | |
| Contributions | $1,078.50 | |
| Government Bond Interest | 25.00 | |
| Savings Account Interest | 9.93 | |
| Transferred from Sanatoria Bed Fund | 136.51 | 1,249.94 |
| | | $1,814.86 |
| **Disbursements:** | | |
| U. S. War Savings Bonds—Series G | $1,000.00 | |
| Intangible Tax | .48 | 1,000.48 |
| Balance in Savings Account June 30, 1947 | | $ 814.38 |

### Schedule B-5

### McCain Endowment Fund

Receipts and Disbursements
For the Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance in Savings Account—July 1, 1946 | | $ 514.78 |
| **Receipts:** | | |
| Contributions | $1,882.40 | |
| Savings Account Interest | 12.53 | |
| Transferred from Sanatoria Bed Fund | 136.51 | 2,031.44 |
| | | $2,546.22 |

| | | |
|---|---|---|
| **Disbursements:** | | |
| U. S. War Savings Bonds Series F | $1,850.00 | |
| Intangible Tax | .45 | 1,850.45 |
| Balance in Savings Account —June 30, 1947 | | $ 695.77 |

### Schedule B-6

### Student Loan Fund

Receipts and Disbursements

For the Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance in Savings Account—July 1, 1946 | | $ 644.69 |
| **Receipts:** | | |
| Contributions | $ 17.00 | |
| Savings Account Interest | 12.73 | 29.73 |
| | | $ 674.42 |
| **Disbursements:** | | |
| Intangible Tax | | .59 |
| Balance in Savings Account—June 30, 1947 | | $ 673.83 |

### Schedule B-7

### George M. Cooper Endowment Fund

Receipts and Disbursements

For the Period from July 1, 1946 to June 30, 1947

| | | |
|---|---|---|
| Balance in Savings Account—July 1, 1946 | | $ 730.00 |
| **Receipts:** | | |
| Contributions | $ 225.50 | |
| Savings Account Interest | 16.07 | |
| Transferred from Sanatoria Bed Fund | 136.51 | 378.08 |
| | | $1,108.08 |
| **Disbursements:** | | |
| U. S. War Savings Bonds —Series F | $ 740.00 | |
| Intangible Tax | .54 | 740.54 |
| Balance in Savings Account June 30, 1947 | | $ 367.54 |

July 24, 1947

Mrs. E. C. Judd, Treasurer
The Auxiliary to the Medical Society of the
State of North Carolina
2108 Woodland Avenue
Raleigh, North Carolina

Dear Madam:

In accordance with your instructions, we have examined the books and records of your Auxiliary for the period from July 1st 1946 to June 30th 1947 and submit herewith the following statements:

Exhibit A—Statement of Assets and Liabilities
Exhibit B—Summary of Receipts and Disbursements
Schedule B-1—General Expense Fund Receipts and Disbursements
Schedule B-2—District Achievement Prize Fund Receipts and Disbursements
Schedule B-3—Sanatoria Bed Fund Receipts and Disbursements
Schedule B-4—Martin L. Stevens Endowment Fund Receipts and Disbursements
Schedule B-5—McCain Endowment Fund Receipts and Disbursements
Schedule B-6—Student Loan Fund Receipts and Disbursements
Schedule B-7—George M. Cooper Endowment Fund Receipts and Disbursements

We inspected securities on hand and obtained confirmations from the depository covering Cash Balances on deposit. We found your records in excellent condition.

### CERTIFICATE

We certify that, in our opinion, the accompanying statements fairly reflect the financial condition at June 30th 1947 and the results from operations for the period from July 1st to June 30th 1947, upon the basis of accounting records consistently maintained.

Respectfully submitted,
R. L. STEELE AND COMPANY
By R. L. Steele, C.P.A.

### Report of the Corresponding Secretary

The corresponding secretary has typed such letters and forms as the president directed through the year, and has written several notes of sympathy.

Respectfully submitted,
MRS. C. L. GRAY

### Memorial Service

### Mrs. Ira C. Long

"Blessed be God, even the Father of our Lord Jesus Christ the Father of mercies, and the God of all comfort." (II Corinthians 1:3)

Let us all stand as we reverently read the names of our members who have been called to Eternal Home since our last meeting.

Mrs. R. S. "Aunt Het" McGeachy, September 27, 1946, New Bern, North Carolina.

Mrs. Frank H. Garris (Florence Spivey), May 28, 1946, Lewiston, North Carolina.

> Some day the silver cord will break,
> And I no more as now shall sing;
> But O, the joy when I shall wake
> Within the palace of the King!
>
> Some day my earthly home will fail,
> I cannot tell how soon 'twill be,
> But this I know—My All in All
> Has now a place in Heav'n for me.
>
> Some day, when fades the golden sun
> Beneath the rosy tinted west,
> My blessed Lord will say, "Well done!"
> And I shall enter into rest.

Let us pray:

Oh, God our Father, Thou who art the Giver of the earthly life and of the eternal, Thou hast blessed us by the fellowships of love. Those whom Thou hast taken away from us for a little while are still ours to love and remember. Secure our faith that nothing shall be able to separate us from the love of God which is in Christ Jesus our Lord. Help us that we may prove worthy of our blessings in Jesus' name. Amen.

Father, in Thy gracious keeping leave we now Thy servants sleeping.

### Report of the Second District Councilor

I attended a meeting of the Pitt County Medical Auxiliary in October. I also served as Lenoir County's president this year.

Letters were written to all the "members-at-large", from whom we received dues last year. In response to these letters, we received $11.00.

There are three organized auxiliaries in the Second District and seven medical societies. I did not organize a new auxiliary during this year; but I have, by personal contact whenever an opportunity arose, stressed auxiliary work and tried to stimulate interest among the members at large.

There are seventy-eight eligible members in the three organized counties, and dues were collected from sixty-two (Pitt County 22; Craven 16; and Lenoir 24). Craven County also sent a $10.00 contribution to the Jane Todd Crawford Memorial Fund in memory of our dear friend, Mrs. R. S. McGeachy.

The three counties reported $85.50 for the McCain Endowment Fund (Pitt $46.00; Craven County $15.00; and Lenoir County $24.50). Pitt County also reports $35.50 for the Cooper Endowment Fund.

There were seven **Hygeia** subscriptions sold, and five **Bulletin** subscriptions sold.

Our guests in the three beds were remembered during the year by two of the auxiliaries.

All of the auxiliaries observed Doctors' Day. Lenoir County gave boutonnieres to all the doctors, had an article in the local paper, and had the churches put notices in their bulletins. Pitt County placed bouquets in the doctors' offices. Craven had a picnic for the doctors and their wives.

All three auxiliaries report that they participated in all types of post-war work. Lenoir County entertained the Seaboard Medical Association in December.

The Second District turned in $73.00 in dues to our state treasurer, $118.50 for the beds, and $10.00 for a special contribution to the Jane Todd Crawford Memorial Fund. Two auxiliaries report more meetings held this year than last, which, I think, indicates an increasing amount of interest in this district.

Respectfully submitted,
MRS. THOMAS LESLIE LEE

### Report of the Fourth District Councilor

As councilor for the Fourth District of the Auxiliary to the Medical Society of the State of North Carolina, I wish to submit the following report:

The district is composed of seven counties—Nash-Edgecombe, Wayne, Wilson, Greene, Johnston and Halifax. Five counties are organized—Nash-Edgecombe, Wayne, Wilson, Greene and Johnston. Although Halifax is not organized, seventeen dues have been collected and sent in through the efforts of Mrs. W. G. Suiter.

I have written many letters and made several phone calls in an effort to organize Halifax. I have attended meetings of the county auxiliaries in Wayne, Nash-Edgecombe, and Wilson. The amount of $329 has been sent in from this district for the McCain Endowment Fund and Cooper Bed.

Nash-Edgecombe has 50 eligible members, 30 paid up. They contributed $25 to the McCain Endowment Fund and $100 to the Cooper Bed. They have had two meetings and have followed the state program. Each month two of their members visited our guest in the Cooper Bed and carried gifts, in addition to sending her cards and letters. Their new officers are: President, Mrs. M. L. Stone; vice president, Mrs. D. L. Knowles; second vice president, Mrs. M. I. Fleming; secretary, Mrs. Sam E. Way; treasurer, Mrs. John L. Lane.

Wayne County, with Mrs. J. W. Rose president, has had a most active year. They have 36 eligible members and a 100 per cent paid-up membership. They have sent in 37 subscriptions to **Hygeia**, have followed the program recommended by the state chairman, and have participated in all drives. They entertained the councilor and president of the Wilson County Auxiliary at one of their meetings and observed Doctors' Day by sending the doctors a surprise gift. They also have an annual picnic in June for the doctors and their entire family. The sum of $100 was given to the McCain Endowment Fund in memory of Dr. McCain.

Wilson County, with Mrs. Herman Easom as president, has had a successful year. With 39 eligible members, 32 are paid. The following is a list of accomplishments: sent in 28 subscriptions to **Hygeia** and 3 to the **Bulletin**; studied the medical care bill at one meeting and have followed the program recommended by the chairman; have participated in cancer, polio, and tuberculosis drives. On Doctors' Day they gave a dinner for the doctors and their wives which was attended by forty. Have visited and remembered with gifts the guest of the Cooper Bed and also sent Christmas gifts to occupants of the other two beds. Seventy-five dollars was sent to the McCain Endowment Fund, and $29 to the Cooper Bed—a total of $104.

Johnston County has 12 paid members. They have done mostly local work in their county hospital located in Smithfield. They gave $12 for a Thanksgiving treat, and Christmas cheer was also provided for patients in their tuberculosis hospital by members of the auxiliary.

Greene County has a membership of five, all paid up.

Respectfully submitted,
MRS. GEORGE W. MITCHELL

### Report of Sixth District Councilor

My report as councilor for the year 1946-47 follows:

| | |
|---|---|
| Number of county auxiliaries in District Six<br>Durham-Orange and Wake | 2 |
| Number of eligible members<br>Durham-Orange 110; Wake 74; Person 5; Warren 5; Franklin 4; Vance 7; Granville 9; Alamance-Caswell 26 | 240 |
| Number of members<br>Durham-Orange 79; Wake 71; and members-at-large 6 | 156 |
| Dues collected | $156.00 |
| Number **Hygeia** subscriptions | 20 |
| Number **Bulletin** subscriptions | 20 |
| Amount of money contributed to beds, loan fund, etc. | $148.25 |

Types of post-war work done by our members:

1. Red Cross
   a. Sewing
   b. Knitting
   c. First aid
2. Nurses' aides
3. Infantile paralysis
4. Cancer control
5. Tuberculosis
6. Y. W. C. A.
7. Girl Scout
8. Rex Hospital Guild

Wake County Auxilary had eight luncheon meetings during the year. Good will and understanding with a genuine feeling of interest and friendship prevail in our group. "Open House" for the doctors and their wives was held during the month of December.

Durham-Orange had two delightful and successful meetings—a dinner meeting in December and a morning coffee hour in March.

I mailed 45 cards to members-at-large.

Respectfully submitted,
MRS. W. T. WARD

### Report of Seventh District Councilor

As councilor for the Seventh District, I submit the following report:

Mecklenburg is the only active auxiliary in my district. This is a grand group and is growing fast. They have 70 paid members and have followed the program recommended by the state program chairman. They have had monthly meetings in the form of a Dutch luncheon, with an after-luncheon speaker. The average attendance is around 40.

This auxiliary entertained their husbands at a Christmas Party at the home of Dr. and Mrs. Raymond Thompson. Around 200 attended.

A District Meeting was held by the Seventh District Councilor in Wadesboro, in November. Our program was based on the history and work of our auxiliary, which was explained by Mrs. Charles Gay of Charlotte. Around 20 ladies were present. After the program, we played Bingo and had delightful refreshments. Later we joined our husbands for dinner at the Country Club. Dues were collected and subscritions were requested for **Hygeia.**

Letters have been written several times to all the other counties in my district; and by personal contact, I have tried to organize at least one of these counties, with no success. A lack of interest is very evident.

The Mecklenburg Auxiliary donated $60.00 to the Red Cross Fund and $100.00 to the McCain Memorial Fund.

This ends my three years as Seventh District Councilor, and I would like to say that they have been very enjoyable ones. It has been a pleasure to meet and work with so many nice ladies.

Respectfully submitted,
MRS. WALTER M. SUMMERVILLE

### Report of Eighth District Councilor

There are nine counties in this district. Of these, six are organized — Forsyth, Guilford, Randolph, Rockingham, and Surry-Yadkin. Wilkes-Alleghany has been given permission by the Medical Society to organize, and it is hoped that this organization will be completed soon. Stokes is no longer affiliated with Forsyth.

There have been 200 paid members reported. We have no record of the members-at-large.

| | |
|---|---|
| Subscriptions to **Hygeia** | 77 |
| Subscriptions to the **Bulletin** | 8 |
| Gifts to funds: | |
| Stevens Bed Fund | $ 10.00 |
| Cooper Bed Fund | 10.00 |
| McCain Endowment Fund | $466.00 |

Gifts were sent to the patients in the sanatoria at Christmas. A record-player and seven bridge boards were presented by Guilford to the Guilford County Sanatorium. Interns and their wives were entertained at a Christmas party by the Winston-Salem group.

More than 1000 hours were reported given in teaching various Red Cross courses, and service in cancer control, tuberculosis drive, nurses' aides, doctors' aides, knitting, sewing, etc.

Doctors' Day was observed with dinners, notices to the press, flowers to the doctors, and money donated to the McCain Bed Fund.

Programs on health education, juvenile delinquency, medical legislation, public relations and occupational therapy were presented.

Respectfully submitted,
MRS. H. L. JOHNSON

### Report of the Ninth District Councilor

The Ninth District held its annual fall meeting at the Lexington Country Club in connection with the Ninth District Medical Society Meeting.

Mrs. Frederick R. Taylor of High Point, State Auxiliary president, spoke briefly on Auxiliary work and the fine opportunities provided us through it.

The subscription drive to **Hygeia** was discussed, and an open forum on Auxiliary work was held.

The slogan, "Every doctor's wife a member," has been stressed throughout the year.

Prior to the district meeting, I mailed 150 form letters which served as invitations to the meeting as well as to inform all doctors' wives of the work of the State Auxiliary.

County reports have come in very slowly; but there is a good possibility that Burke, Caldwell and Davidson may have nearly 100 per cent membership. I regret being unable to report definite figures at this time.

Respectfully submitted,
MRS ALFRED A. KENT, Jr.

### Report of the Councilor to the Southern Medical Auxiliary

The twenty-second annual meeting of the Woman's Auxiliary to the Southern Medical Association was held at Miami, Florida, November 4, 5, 6, 1946, with the Columbus Hotel as headquarters. On Tuesday, November 5, at 8:30 a.m. the Executive Board met at breakfast at the Columbus Hotel in the Biscayne Room. The president, Mrs. W. W. Potter, presided. There were 22 present. Among the guests were Mrs. Jesse D. Hamer, president of the Auxiliary to the American Medical Association, and Dr. Seale Harris of Birmingham, Alabama, who gave an interesting talk on the first organization meeting of the Southern Medical Auxiliary. At 10:30 a.m. the Auxiliary met at White Temple, Miami, in a business meeting. At this meeting we heard Dr. Harrison Shoulders, president of the American Medical Association. Following this meeting the Auxiliary met for its annual luncheon at the Columbus Hotel, with 400 present.

On Wednesday the Auxiliary met for its concluding session at White Temple. Reports from officers and chairmen of standing committees were received and accepted. Mrs. Jesse D. Hamer, president of the Auxiliary to the American Medical Association, gave an interesting talk on the aims and plans of the National Auxiliary. At this meeting I made a report as councilor of the Auxiliary to the Medical Society of the State of North Carolina. The total number of ladies registered for the Miami meeting was 560.

The post-convention meeting of the Executive Board was held immediately following the conclusion of the general session, Mrs. Wiley Buffington, president, of New Orleans, Louisiana, presiding. There was a discussion of plans for the next year's work, stress to be laid upon the three projects: (1) Doctors' Day, (2) research and romance of medicine, (3) Jane Todd Crawford Memorial Fund. The report of the treasurer of the Jane Todd Crawford Fund showed a total of $2,202.65.

As your councilor I have sent in all reports to the Southern Medical Auxiliary as requested. Mrs. Herbert Ogburn, historian, prepared a history of the North Carolina Medical Auxiliary which was sent to the historian of the Southern Medical Auxiliary to be filed in Louisville, Kentucky.

Respectfully submitted,
MRS. CLYDE R. HEDRICK

### Report of the Program Chairman

As retiring program chairman for the Auxiliary to the North Carolina Medical Society, I wish to submit the following report for the year 1946-47.

The year was begun with an article written for publication in the October issue of the **North Carolina Medical Journal** on our work which was outlined for the entire year. Twenty-eight letters were mailed to the county presidents throughout the state, urging regular meetings or as many meetings as possible, together with programs on the work to be done.

Our program for the year started out as a six-pointer, which included juvenile delinquency, post war planning, health education, medical legislation, scientific discoveries, and a social get-together for the doctors and doctors' wives. But a study of the Blue Cross plan was added at the beginning of the year 1947, making our program a seven-pointer.

Juvenile delinquency and post war planning headed the program as our most important work; therefore, I know it will be most gratifying to each of you, as it has been to me, to learn that according to a recent report which I received, juvenile delinquency in North Carolina has been on a slight decline. Of course, there is still much work to be done in this field, but each little improvement means so much. As to our post war program, much has been done in the past year to help our returned veterans. One of the outstanding features has been the little homes which have been provided for these boys who were so eager to complete their education, and still have their families with them. I cannot help but feel that we have had a part in helping in these two most important improvements.

A report of our work for the year was sent to Mrs. Henry Garnjobst, national program chairman; and after checking with the National Auxiliary's ten-point program, I found that we had participated in seven points, even though we did not receive the national program outline until December, when our program was already outlined and working.

As I bring my report to a close, I want to try to express my sincere gratitude to the three very capable presidents under whom I have served (Mrs. J. T. Saunders, Mrs. Erick Bell, and Mrs. Frederick Taylor) for their help and advice; and to each member of the Boards, may I say, "Thank you for your good fellowship and warm friendliness which I have so enjoyed. It has been a very pleasant three years, years I shall always remember and cherish." Again let me say I am filled with love and gratitude to the "Official Family," as our sweet Mrs. McCain referred to you, when she so graciously welcomed me into this "Lovely Family."

Respectfully submitted,
MRS. MILLARD D. HILL

### Report of the Chairman of the Jane Todd Crawford Memorial Fund

A letter was sent to each of our district councilors on January 8, 1947. I was hoping that I would get a contribution from each district for the Jane Todd Crawford Memorial Fund, but in vain.

Our Craven County Auxiliary contributed $10.00 in memory of Mrs. R. S. McGeachy for the Jane Todd Crawford Memorial Fund.

Respectfully submitted,
MRS. C. S. BARKER

### Report of the Public Relations Chairman

As chairman of public relations, I attended the Executive Board meeting at Sanatorium in the fall. I have tried to encourage the auxiliaries to cooperate in every way possible with the health program of the state by helping with the various drives, with hospital work, and by promoting health programs in the auxiliaries. I have written a short article for the Auxiliary section of the **North Carolina Medical Journal.**

Respectfully submitted,
MRS. JOHN P. KENNEDY

### Report of the Press and Publicity Chairman

The press and publicity chairman is pleased to report that the Auxiliary page in the **North Carolina Medical Journal** has been filled each month except January.

The material consisted of three messages from our president; a report on the state Board meeting; **Hygeia** notes; a report on the work done in 1945-1946; program suggestions; health education; sanatoria beds; a challenge to doctors' wives; public relations.

Publicity has been given to leading state newspapers on the October Board meeting at Sanatorium, and on the convention at Virginia Beach.

Respectfully submitted,
MRS. S. S. SAUNDERS

### Report of the Bulletin Chairman

There have been forty-five subscriptions to the **Bulletin** this year.

Respectfully submitted,
MRS. WINGATE M. JOHNSON

### Report of Hygeia Chairman

193 subscriptions.

Forsyth leading with 44; Wayne 37; Guilford 33; Wilson 26.

16 counties represented in the total number of subscriptions.

$90.00 sent to Mrs. Judd for the Bed Fund.

Respectfully submitted,
MRS. D. M. ROYAL

### Report of the Historian

(1) Attended Board Meeting at Sanatorium in October.

(2) Unable to attend annual meeting in May.

(3) Contacted 27 auxiliaries in regard to activities during past year.

(4) Two reports sent to the Southern Medical Auxiliary giving history and activities of the Auxiliary to the Medical Society of the State of North Carolina.

(5) Have recorded histories and reports received from active branches of the Auxiliary to the Medical Society of the State of North Carolina.

(6) Made three copies of the history.

Respectfully submitted,
MRS. HERBERT H. OGBURN

### Report of Scrapbook Chairman

The splendid record of the year's work under the capable leadership of our president, Mrs. Frederick R. Taylor, can be attested by the clippings sent in to our scrapbook. Pictures and newspaper reports of interesting activities throughout the state may be seen on these pages. It was the happy privilege of your scrapbook chairman to receive these clippings, and preserve them for our records.

The scrapbooks are here today and we invite you to look through them.

Respectfully submitted,
MRS. R. A. MOORE

### Report of the Post War Planning Chairman

As chairman of the Post War Planning Committee, I have urged each auxiliary to study the following:

(1) The prepayment medical plans of our state, stressing particularly the Blue Cross plans; (2) the good health bill as presented to our 1947 legislators; and (3) the medical and health bills that are pending in our Congress at this time.

It is the duty of each of us as doctors' wives to familiarize ourselves with these facts that we may more intelligently correct or defend certain statements that are often made by the laity.

Respectfully submitted,
MRS. K. B. PACE

### Report of the Chairman of the Nominating Committee

The following officers retain their offices for the next year:

President—Mrs. W. Reece Berryhill
First Vice President—Mrs. Frederick R. Taylor
Second Vice President—Mrs. B. W. Roberts
Treasurer—Mrs. E. C. Judd

The following candidates are to be presented by the Nominating Committee at the general business session of the Auxiliary in May:

President-Elect—Mrs. Raymond Thompson, Charlotte
Recording Secretary—Mrs. David Cayer, Winston-Salem
Corresponding Secretary (appointed by the president)—Mrs. Fred G. Patterson, Jr., Chapel Hill

Respectfully submitted,
MRS. R. L. McMILLAN

# ROSTER OF MEMBERS

## 1946-1947

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Mrs. Adams, L. C.........Smithfield
Mrs. Adams, R. A. Roanoke Rapids
Mrs. Adams, R. K.........Morganton
Mrs. Adams, Robert.........Charlotte
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Mrs. Allen, Charles.......Wadesboro
Mrs. Allen, George C...Lumberton
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Mrs. Anderson, E. C...Wilmington
Mrs. Anderson, N.........Asheville
Mrs. Anderson, Paul V.............
Mrs. Anderson, W. B.....Durham
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Mrs. Armistead, D. B...Greenville
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Mrs. Austin, F. D., Jr.....Charlotte
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Mrs. Aycock, B. L.........Princeton
Mrs. Aycock, E. B.........Greenville
Mrs. Bailey, C. W.....Rocky Mount
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Mrs. Baker, L. D.........Durham
Mrs. Baker, Tom W.......Charlotte
Mrs. Ballard, Claude.........Kinston
Mrs. Barbee, G. S.........Zebulon
Mrs. Bardin, Robert.........Wilson
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Mrs. Barefoot, W. F...Wilmington
Mrs. Barker, C. S.........New Bern
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Mrs. Bass, R. E.........Chadbourn
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Mrs. Beale, Seth M.........Elkin
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Mrs. Beam, R. S.........Lumberton
Mrs. Beasley, E. B.........Fountain
Mrs. Beaver, Charles..Greensboro
Mrs. Beavers, William O. Greensboro
Mrs. Beckwith, Blanche Roanoke Rapids
Mrs. Beckwith, C. P. Roanoke Rapids
Mrs. Belcher, C. C.........Asheville
Mrs. Bell, Erick.........Wilson
Mrs. Bell, Felix O.......Burlington
Mrs. Bell, O. E.........Rocky Mount
Mrs. Bell, S. A.........Hamptonville
Mrs. Belton, J. F...Winston-Salem
Mrs. Benbow, Edgar Winston-Salem
Mrs. Bender, J. R...Winston-Salem
Mrs. Bender, John J...Red Springs
Mrs. Benson, N. O.......Lumberton
Mrs. Benton, Geo., Jr. ..Goldsboro
Mrs. Benton, Geo., Sr.....Fremont
Mrs. Benton, Wayne J. Greensboro
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Mrs. Biggs, J. I.........Lumberton
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Mrs. Bizzell, Malcolm..Goldsboro
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Mrs. Blackwelder, Verne H. Lenoir
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Mrs. Bowman, H. E.......Aberdeen
Mrs. Brabson, J. A.........Charlotte
Mrs. Bradford, George Winston-Salem
Mrs. Bradford, W. Z.....Charlotte
Mrs. Bradford, Wallace B. Charlotte
Mrs. Bradshaw, H. H. Winston-Salem
Mrs. Bradshaw, T. G.........Wilson
Mrs. Brandon, H. A.....Yadkinville
Mrs. Brantley, J. C...Rocky Mount
Mrs. Bratten, P. C. Winston-Salem
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Mrs. Brewton, W. A.......Asheville
Mrs. Brian, E. W.........Raleigh
Mrs. Bridgers, D. H...Bladenboro
Mrs. Bristow, C. O...Rockingham
Mrs. Britt, J. N.........Lumberton
Mrs. Britt, T. C.........Mt. Airy
Mrs. Brockmann, Harry L. High Point
Mrs. Bronse, I. E.......Wilmington
Mrs. Brooks, Bruce Winston-Salem
Mrs. Brooks, Fred.........Greenville
Mrs. Brooks, R. E.......Burlington
Mrs. Brown, Charles .........Hamlet
Mrs. Brown, G. W.........Raeford
Mrs. Brown, Katherine V. Fairmont
Mrs. Brown, Kermit.........Asheville
Mrs. Brown, Landis.......Southport
Mrs. Brown, M. S. Roanoke Rapids
Mrs. Brown, Walter.........Wilson
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Mrs. Buchanan, L. T...Laurinburg
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Mrs. Bulluck, Ernest S. Wilmington
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Mrs. Bunn, R. W...Winston-Salem
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Miss Byerly, Victoria..Cooleemee
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Mrs. Cathell, J. L.........Lexington

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Mrs. Cheves, W. G............Raleigh
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Mrs. Clark, Lintner..........Raleigh
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Mrs. Clary, Wm...........Greensboro
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Mrs. Coleman, H. R...Wilmington
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Mrs. Cooper, G. M.............Raleigh
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Mrs. Covington, J. M. C. Roanoke Rapids
Mrs. Covington, J. M., Jr. Wadesboro
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Mrs. Davis, P. B.........High Point
Mrs. Davis, R. B.........Greensboro
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Mrs. Fleming, M. I...Rocky Mount
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Mrs. Freeman, M. R...........Bailey
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Mrs. Geddie, Kenneth...High Point
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Mrs. Gibson, M. R..............Raleigh
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Mrs. Gilmour, Monroe T. Charlotte
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Mrs. Goodwin, O. S..................Apex
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Mrs. Grayson, C. S.....High Point
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Mrs. Green, Joe....Biltmore Forest
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Mrs. Griffis, John.................Denton
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Mrs. Hackney, B. H.........Lucama
Mrs. Hagna, L. W.............Marion
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Mrs. Hamer, Alfred W., Jr. Morganton

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Mrs. Hamilton, J. H........Raleigh
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Mrs. Harper, J. H.........Snow Hill
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Mrs. Harrell, L. J...... Goldsboro
Mrs. Harrell, W. H.........Creswell
Mrs. Harrell, W. L............Ellerbe
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Mrs. Harton, R. A...........Durham
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Mrs. Hatcher, M. A...........Hamlet
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Mrs. Hedgpeth, L. R...Lumberton
Mrs. Hedgpeth, W. C...Lumberton
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Mrs. James, F. P.......Laurinburg
Mrs. James, W. D., Jr.......Hamlet
Mrs. James, W. D., Sr.......Hamlet
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Mrs. Jennings, R. G. Thomasville
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Mrs. Johnson, Gale................Dunn
Mrs. Johnson, George Wilmington
Mrs. Johnson, H. L..............Elkin
Mrs. Johnson, J. R...............Dunn
Mrs. Johnson, J. R............... Elkin
Mrs. Johnson, T. C.....Lumberton
Mrs. Johnson, W. A.....Reidsville
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Mrs. Jones, D. H...........Smithfield
Mrs. Jones, Ira S..............Lenoir
Mrs. Jones, R. J.................Kinston
Mrs. Jones, T. T..............Durham
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Mrs. Judd, J. M...................Varina
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Mrs. Kafer, O. O...........New Bern
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Mrs. Kennedy, Leon T...Charlotte
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Mrs. King, Parks............Charlotte
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Mrs. Kinsman, Blanche S. Hamlet
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Mrs. Kirksey, J. J.......Morganton
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Mrs. Kittelson, ..............Asheville
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Mrs. Kornegay, R. D. Rocky Mount
Mrs. Knight, W. P.....Greensboro
Mrs. Knoefel, A. E. Black Mountain
Mrs. Knowles, D. L...Rocky Mount
Mrs. Knox, J. C.........Wilmington
Mrs. Knox, John...........Lumberton
Mrs. Koonce, Donald..Wilmington
Mrs. Koseruba, George Wilmington
Mrs. Kutscher, G. W.....Asheville
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Mrs. Lang, Andrew....Morganton
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Mrs. Lapsley, A. F.............Badin
Mrs. Lassiter, Vernon Winston-Salem
Mrs. Lassiter, Will.................Selma
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Mrs. Lawrence, B. J.........Raleigh
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Mrs. Lee, Mike....................Kinston
Mrs. Lennon, H. C.....Greensboro
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Mrs. Levy, E. B.........Sanatorium
Mrs. Liles, L. C.................Raleigh
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Mrs. Long, Ira C............Goldsboro
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Mrs. Long, W. M..........Mocksville
Mrs. Long, Zack.........Rockingham
Mrs. Lore, Ralph...................Lenoir
Mrs. Lott, William...........Biltmore
Mrs. Lovill, Robert J.....Mt. Airy
Mrs. Lounsbury, J. B. Wilmington
Mrs. Lowery, J. R.........Salisbury
Mrs. Lubchenko, N. E. Harrisburg
Mrs. Lupton, E. S..............Graham

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Mrs. Lyun, C. K.......Valdese
Mrs. Mackie, G. C.......Wake Forest
Mrs. Mackie, Thomas Winston-Salem
Mrs. Macon, G. H.......Warrenton
Mrs. Mallory, S. A.......Yanceyville
Mrs. Maness, A. K.......Greensboro
Mrs. Marlowe, W. A.......Snow Hill
Mrs. Marr, J. T.......Winston-Salem
Mrs. Marshall, James Winston-Salem
Mrs. Martin, Ben.......Winston-Salem
Mrs. Martin, J. A.......Lumberton
Mrs. Massey, Bill.......Smithfield
Mrs. Massey, C. C.......Charlotte
Mrs. Matheson, J. G.......Ahoskie
Mrs. Matheson, R. A.......Raeford
Mrs. Mathews, Robert Greensboro
Mrs. Mathiesen, K. M.......Pittsboro
Mrs. Matthews, Van M. Charlotte
Mrs. Matthews, W. W.......Leaksville
Mrs. Matthews, Wm. C. Charlotte
Mrs. Matthews, Wallace R. Biltmore Forest
Mrs. Mauzy, Hampton Winston-Salem
Mrs. Mayer, Walter B.......Charlotte
Mrs. McAllister, H. M., Jr. Lumberton
Mrs. McBane, T. W.......Pittsboro
Mrs. McBride, M. H.......Reidsville
Mrs. McBryde, A. M.......Durham
Mrs. McCain, P. P. Southern Pines
Mrs. McCall, W. H.......Asheville
Mrs. McCampbell, J. C. Morganton
Mrs. McCants, C. H. Winston-Salem
Mrs. McCarty, R. L.......Charlotte
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Mrs. McClelland, J. O.......Maxton
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Mrs. McMillan, Robert Winston-Salem
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Mrs. McPherson, R. G.......Graham
Mrs. McPherson, S. D.......Durham
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Mrs. Menzies, H. C.......Hickory
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# BULLETIN BOARD

(CONTINUED FROM PAGE 608)

## CORRECTIONS

In the county roster and alphabetical list of fellows which appeared in the August issue, the specialty of Dr. Brockton R. Lyon of Greensboro was given as "GP." Since Dr. Lyon's practice is confined to surgery, this listing should be changed to "S."

* * * *

In the list of winners of the Moore County Medical Society Medal, published in the August issue (page 471), the winner for 1933 should be Dr. Henry L. Sloan rather than Dr. H. F. Sloan.

Any additional corrections for the roster should be sent at once to Dr. Roscoe McMillan, Red Springs, N. C.

## COLLECTION OF CONFEDERATE SURGICAL INSTRUMENTS

A unique collection of Confederate surgical instruments has been placed in the state Hall of History, it was announced by Dr. Christopher Crittenden, Director of the Department of Archives and History. They were the property of Dr. Edmund Burke Haywood of Raleigh and have been donated by Mr. B. H. Bridgers of Wilmington, Dr. Haywood's grandson. They have been labelled and arranged by Mrs. Joye E. Jordan, head of the Hall of History, where they are now on display.

## SOUTHEASTERN REGIONAL CONFERENCE OF THE COUNCIL ON MEDICAL SERVICE

The Southeastern Regional Conference of the Council on Medical Service of the American Medical Association will be held in Atlanta, Georgia, on October 8. Among the speakers will be Dr. Paul F. Whitaker of Kinston, whose subject is "How North Carolina Is Meeting Its Health Problems." The conference is sponsored by the state medical societies of Alabama, Georgia, Florida, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. The Rural Health Committee of these states will hold a dinner meeting on the evening of October 8.

The chairman of the committee on arrangements is Dr. Edgar H. Greene, 478 Peachtree Street, N.E., Atlanta.

## INSTRUCTIONAL COURSE IN ALLERGY

The American College of Allergists has announced that its annual Fall Graduate Instructional Course in Allergy will be given in Cincinnati, Ohio, November 3-8 inclusive, under the auspices of the Medical College of the University of Cincinnati.

The program this year is the best ever offered by the College. Forty-six formal lectures are listed and also a special allergy clinic of case presentations. An added feature this year will be three informal discussion groups led by various members of the faculty. The faculty is composed of more than forty outstanding physicians and scientists from prominent medical centers and colleges in the United States and Canada.

Programs and complete information can be obtained by writing to the College Secretary, Dr. Fred W. Wittich, 423 La Salle Medical Building, Minneapolis 2, Minnesota.

## NEWS NOTES FROM THE AMERICAN MEDICAL ASSOCIATION

Dr. Donald G. Anderson, former dean of Boston University School of Medicine, has taken over Dr. Victor Johnson's duties as secretary of the Council on Medical Education and Hospitals. Dr. Anderson, who received his M.D. degree from Columbia in 1939, at one time was associated with Dr. Chester Keefer in penicillin research for the Office of Scientific Research and Development. His research publications deal primarily with employment of the sulfa drugs and penicillin and streptomycin in the chemotherapy of infections.

## NEWS NOTES FROM THE OFFICE OF THE SURGEON GENERAL

### Army Doctors and Dentists to Get Extra $100 a Month

Major General Raymond W. Bliss, Surgeon General of the Army, announced recently that effective September 1 an additional $100 a month will be paid to all Regular Army Medical and Dental Corps officers as well as other offcers serving voluntarily on extended active duty in these Corps.

## VETERANS ADMINISTRATION

Veterans Administration will offer physicians residency type training in tuberculosis for the first time in its history, Dr. Paul R. Hawley, VA's chief medical director, announced. The training program was approved by the American Medical Association.

Five VA hospitals where training will be available are in Brecksville, O., Alexandria, La., Excelsior Springs, Mo., Oteen, N. C., and McKinney, Texas. Although the hospitals at Alexandria and Oteen are not now associated with medical schools under the VA Deans' Committee plan, physicians serving there may earn credit toward the examinations of the American Specialty Board for Internal Medicine and its sub-specialty board for tuberculosis. The other three VA hospitals are affiliated with medical schools under the Deans' Committee program.

* * * *

One of every 30 veterans in school under the G.I. Bill is studying medicine or related subjects, a Veterans Administration sampling of school-going veterans disclosed.

Of the total of 1,825,000 veterans in schools, colleges and universities on May 1, the survey showed 59,316 enrolled in all phases of medical training.

## RESEARCH COUNCIL ON PROBLEMS OF ALCOHOL

Announcement was made recently of the first large-scale nation-wide attack on problem drinking by the Research Council on Problems of Alcohol, an associated society of The American Association for the Advancement of Science, 60 East 42nd Street, New York, N. Y.

Organized ten years ago, The Research Council has been working quietly and energetically in sponsoring individual research projects among leading scientific institutions to get at the fundamental causes of problem drinking, which affects the lives of over 750,000 people in the United States. The primary objective of the Council is to learn more about these fundamental causes and to develop effective methods of treatment and prevention.

**WANTED IMMEDIATELY—ASSISTANTS**

**Two industrial colliery physicians.**

**One full-time work. Another who can use x-ray machine and read films. Good living conditions and schools. Steam-heated 3-bedroom homes. Permanent. About $6,000 annual net income. Applicants must be sober and dependable. State all details in first letter.**

**Write physician in charge,**
**Stonega, Va.**

**WANTED—PUBLIC HEALTH OFFICER**

**The Cleveland County Health Department is in need of a full-time Public Health Officer. The Department, located in Shelby, North Carolina, is fully staffed and well equipped. Any doctor interested in locating here should address his application to the Secretary of the Cleveland County Board of Health, Box 220, Shelby, North Carolina.**

### New Hope in Breast Cancer

Exceptionally favorable results in treatment of advanced carcinoma of the female breast with large doses of Oreton, testosterone propionate, have been reported by clinical research workers at New York's Memorial Hospital Cancer Clinic. Dr. Frank A. Adair, in a paper published in Surgery, Gynecology and Obstetrics 84:719 (1947) found that more than half of even the inoperable hopeless cases of breast cancer showed improvement in general health.

Relief from pain and regression of the metastases to the bone, with formation of new bone resulted. These excellent developments were obtained in patients for whom surgery and x-ray offered no help.

# NORTH CAROLINA MEDICAL JOURNAL

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## THE EMOTIONAL TOLL OF COMBAT EXPERIENCE

LESLIE B. HOHMAN, M.D.

DURHAM

The war's end, nearly two years ago, should have settled finally the psychiatric problems of our twelve to fifteen million men who were in the military service between December 7, 1941, and August 15, 1945, if we were to accept the opinion of so many laymen, doctors, and even psychiatrists that psychiatric disabilities represented, for the most part, an effort to escape military service or combat, or to obtain or hold on to a pension.

With the popularization of psychiatric concepts and psychiatric lingo, all men have become specialists in the easy and glib dismissal of emotional illness as a method of conscious escape. On all sides we learn that men broke down in the combat areas to get sent to the rear, and that they stayed sick to be returned to the United States, then to be put on limited duty, then to get discharged, and finally to get pensions. For the "specialists" of this opinion, the explanation and understanding of the emotional disturbances precipitated by the war are very simple; but the facts are contrary to this easy dimissal of the problem. Evacuation to the rear, even after many of the "miracle cures" of narcoanalysis and narco-synthesis, did not result in recovery, nor did evacuation to the states, or limited duty, or medical discharge, or the granting of a permanent pension. Men did not recover as they were expected to, nor were they able to make their adjustment to life as we had been so readily promised by some military men.

I would certainly be the last to want to make invalids of our war-ravaged veterans by sentimentalizing and exaggerating their emotional disabilities. I do, however, insist that they are entitled to understanding and patience that comes from a real knowledge of the nature of emotional disorders and their long-standing residuals. Let us admit and dismiss the fact that a small number of military personnel were malingerers and psychopaths. The number was truly small, and most of them were in service only a few months—long enough to have the slow military machinery grind out their medical discharges.

The vast number of military personnel saw the fight through from their induction to their discharge on points, or until they were given a medical discharge after service in combat areas or participation in combat itself. I would like to dispell the idea that ran rife throughout the war—that only men of poor background suffered emotional disability in the war. We weeded out the largest part of those poorly endowed men in our induction centers, and although some slipped through or were sadistically pushed in, the army and navy were constituted by a cross section of the above-average American citizenry. If the development of nervous or emotional disability was evidence of poor emotional endowment, then we must indict the whole of our population because abnormal emotional reactions of serious import were practically universal in combat troops.

### *Causes of Combat Fatigue*

Millions of men were subjected to stresses and strains for which they had in no way been trained: separation from home; sepa-

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Read before the Second General Session, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

From the Department of Neuropsychiatry, Duke University School of Medicine, Durham, North Carolina.

ration from women; exposure to tropical heat and terrifying tropical disease; long hours of boredom; uninteresting work; suppresion of individual ambition; hourly, daily, and month-long threat of death or ghastly injury. The men had no certainty of victory or termination of service, and felt hopeless about ever getting home. For many this period of stress lasted two to three years.

### *Immediate Effects of Combat Fatigue*

The rank and file of men reacted to this situation with faithfulness to duty. Gradually but almost invariably, however, there developed a pathologic emotional state that involved not only their feelings, but their thinking and their body functions. At first they showed abnormal sensitivity to noises, exaggerated startle reaction, increased sweating, excessive flushing of the face, marked tremor, disturbed sleep, and often terrifying nightmares and combat dreams. Their mood showed increasing anxiety with uneasiness, and gradually increasing irritability, undue sensitiveness, pathologic homesickness, and deepening and increasing brooding depression. This mood would frequently alternate with periods of elation, undue enthusiasm, and even a silly or slap-happy feeling. Thinking and talking became slowed, concentration was difficult, weakness and fatigability appeared, and ambition, interest and pep disappeared. They became subjectively and even objectively confused, and developed intolerable restlessness. Sex function was almost universally disturbed, and this disturbance was often accompanied by violent emotional outbursts. The irritability and depression increased at times to the point of violent outbursts of rage; anxiety increased to terrifying constant fear or panic; and often the gloomy, brooding depression, fear, and anger were dramatized as an intolerable sense of guilt or were expressed in paranoid attitudes toward superiors, civilians, or tragically, even against a man's own family and loved ones.

### *The Ubiquity of Combat Fatigue*

This emotional toll was collected not only from the men whose disability reached the degree of severity which made them no longer serviceable for military duty and resulted in their admission to the hospital as psychiatric patients, but from all the men in the combat zones. The conviction that this emotional syndrome was ubiquitous in combat troops was subjected to investigation by examining a large group of men who had been returned from the combat zones but who were then and were to continue in duty status. An opportunity to examine psychiatrically 750 naval personnel was made available. These were upper-rated pharmacist mates—unselected except in the sense that they had successfully been through combat and had high enough intelligence to be sent to an advanced school of training. These men had been out of the combat zone for periods varying from three months to two years, and yet two thirds of them had enough of the symptoms enumerated above to warrant a psychiatric diagnosis of so-called combat fatigue, war neurosis, or operational fatigue. It became evident that this universal abnormal picture was not the result of a desire to escape service—none of these men were trying to get on the sick list—but was due to illness that affected all men subjected to the frightful strains of a long, disastrous war. Further evidence was forthcoming that a desire to avoid service could not be the cause of this disability. We examined 100 men who had been wounded in combat and had recovered sufficiently to permit discharge or voluntary return to duty. Each man because of his injuries was entitled to discharge from military service on request without any disapprobation. Yet the percentage of men affected with the combat fatigue syndrome in this group was the same as in the group of uninjured men in duty status.

### *Continuing Effects of Combat Fatigue*

When the war ended, all the predictions that the patients with combat fatigue would suddenly recover were tragically upset. The men continued in their same gloomy, rut-like depressive irritability, with the same hypochondriacal complaints, the same sex disturbances, the same attacks of fear and rage. Recovery, which had been slow in most cases, although rapid in others, continued in its own uninterrupted way.

From a close study of these emotional illnesses, it was the conviction of many of us that we were dealing with a type of disorder that arose in response to prolonged danger, boredom, and emotional deprivation; but that it would tend to heal spontaneously after variable periods of time, as do the emotional disturbances of civilians in peacetime. Psychiatric knowledge told us that, although ultimate recovery could be predicted, the time required for recovery could not be. We knew that months and years were better measures of the time than days and weeks. We knew that depressive psychiatric reactions or anxiety states were profound disturbances which were not under voluntary control and could not be terminated by manipulation of the environment.

For those who wished to see the combat neurosis as something close to malingering, even if the euphemistic term "secondary gains" was employed, investigation of the facts is disappointing. I examined about 600 "well" returned veterans who were re-entering universities in the fall of 1946. Of those who had seen combat or had been in the combat areas, 40 per cent still showed symptoms of the combat fatigue syndrome, with depression, irritability, restlessness, general slowing of thinking and concentrating ability, headaches, anxiety attacks, disturbed sleep, tremor, and sweating. A much higher percentage reported that they had had the symptoms during the war but that they had slowly disappeared.

I have recently undertaken a survey of patients discharged from a naval hospital with a diagnosis of combat fatigue* during late 1944 and 1945. The results will be disappointing to those who felt that only discharge from the armed forces was necessary for such patients' recovery. Although the study is not completed, we have been able to get reports from about 100 of the patients. The percentage of recoveries is painfully small, while the percentage of continuing illness is painfully high.

Our records of cases examined for the veterans bureau show that a high percentage of veterans have persistent symptoms which are socially and personally disturbing, if not economically incapacitating.

I examined the consecutive records of examination of 200 men with combat duty discharged from the service, many of them on points (that is, without recognized medical disability at the time of discharge), and found that the symptoms of this emotional syndrome of fear, anger, and depression are still disturbingly frequent. Depression persists in 83 per cent of the cases, restlessness in 74 per cent, irritability and headaches in 65 per cent, startle reaction in 65 per cent, terrifying combat dreams in 48 per cent, sleep disturbances in 46 per cent, fear attacks in 42 per cent, and sex disturbances (lessened desire to impotence) in 32 per cent of the cases. These are men long since discharged from the service—many of them without pensions or with pensions so small that it is incredible that they could influence a man's behavior. Many of these men have not asked for pensions, but do want and need treatment and help.

### *Conclusion*

These men are entitled to a recognition of the fact that their depression—and sometimes elation, irritability, dissatisfaction, physical complaining, unreasonable attitudes, sleep difficulties, and inability to work at times are not due to plain cussedness or laziness, but are the results of emotional illness that all combat troops suffered in lesser or greater degree as the result of intolerable strain. It is the physician who can interpret these men to their families and communities, and this paper is presented in an effort to obtain, on behalf of these veterans of combat duty, the understanding and cooperation of every North Carolina doctor.

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**The family doctor as a psychosomatic physician.** Psychosomatic is a new term, but it describes an approach to medicine as old as the art of healing itself. It is not a new specialty but is rather a point of view which applies to all aspects of medicine and surgery. It does not mean less study of the soma: it only means more study of the psyche. Its subject matter is founded on important advances in physical medicine as well as on the biologically oriented psychology of Freud, without whose epochal discoveries no work on psychosomatic medicine could be attempted. It is not a new discovery, but rather a reaffirmation of the ancient principle that the mind and the body are interactive and interdependent, a principle that has always guided the intelligent general practitioner. Indeed the traditional old family doctor very often was an excellent psychosomatic physician, although he never thought of himself as such. His patients usually were intimate friends, and he was familiar with their social situations, as well as with their psychologic and physical peculiarities. He was well aware that these factors were related to illness. As a science, psychosomatic medicine aims at discovering the precise nature of this relationship for the greater benefit of doctors and patients alike.—Edward Weiss: Psychosomatic Diagnosis, Am. Practitioner 1:156 (Nov.) 1946.

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* For administrative medical purposes the diagnosis actually recorded was "psychoneurosis."

# THERAPY OF TETANUS

Mary Margaret McLeod, M.D., F.A.A.P.

Sanford

Tetanus remains a serious disease. Although its prevention is easy and is well understood, there were 615 deaths from tetanus in the United States in 1944—230 of these in children under 15 years of age(1). No condition in medicine requires clearer clinical judgment and more careful management than tetanus. An understanding of the disease is essential to a rational plan of therapy.

Tetanus is caused by an exotoxin, tetanospasmin, formed by actively germinating spores of Bacillus tetani. In order for these spores to germinate and produce this toxin they must be introduced into tissue of lowered oxygen tension. The oxygen tension of tissue may be reduced by trauma, hemorrhage, necrosis, poor blood supply, the presence of a foreign body, or the presence of other organisms. The toxin is elaborated during an incubation period ranging from one day to several weeks(2), after which it is carried by the blood to all parts of the body. This toxin has a strong affinity for motor neurons and produces a hyperirritable nervous system which is responsible for the reflex convulsions. In addition to the changes in the central nervous system, there is damage to the myoneural junction of voluntary muscles which results in constant generalized muscle spasm. Thus the affected person suffers from basal rigidity of his voluntary muscles as well as from recurrent spasms of these same muscles in response to internal or external stimuli acting on the hyperirritable nervous system.

The severity of the disease depends upon the amount of toxin which is formed at the focus of infection and the amount which becomes fixed to the responsive tissue of the affected person.

The clinical manifestations of the disease vary from very mild to very severe. The basal rigidity may involve only a few muscles near the wound, or the entire voluntary musculature may be rigid. The hyperirritability of the nervous system may be so mild that generalized spasms, if any occur, are very slight; or the patient may die early from asphyxia due to a generalized convulsion. The disease may be very mild at first and suddenly become very severe, or may be very severe from the beginning. Although some few cases are mild and terminate in spontaneous recovery, no one can tell at the onset which cases will be serious; hence all cases should be treated early and adequately until convalescence is definitely established.

Circulating toxin can be neutralized by introducing antitoxin into the circulation, but there is no known way to dissociate toxin which has become fixed to nervous tissue; hence early diagnosis and prompt treatment are imperative.

### *Diagnosis*

The patient should be disturbed as little as possible by diagnostic procedures. A fatal convulsion may be precipitated by a spinal puncture or even by a less painful procedure. Sedation may be necessary before an examination. I remember a 4-year-old child who had a severe convulsion on the way to the hospital. He was so apprehensive of strange nurses and doctors that, before I even approached the child, a sedative was given through a well lubricated catheter slipped into the rectum by the mother.

Perhaps the most important factor in making the diagnosis is to recall early that there is such a disease as tetanus. Typically, the patient complains of abdominal and back pain. He may or may not have trouble opening his mouth. There is a peculiar spastic gait as if he were walking on his heels. He may seem to be in high spirits and may have a sarcastic facies. There is a generalized muscle spasticity, and after a period of time generalized convulsions. Early, these generalized muscle spasms may look as if the patient were shivering. The patient is clear mentally and the temperature is normal or only slightly elevated. The blood count, spinal fluid examination, and other laboratory findings are normal. As the disease progresses, the rigidity becomes more marked, generalized spasms are more severe and frequent, and finally the temperature rises as the patient develops pneumonia or dies of asphyxia in a generalized tetanic convulsion.

Typical cases with marked symptoms are easy to diagnose. Once I made a diagnosis

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Read before the Section on Pediatrics, Medical Society of the State of North Carolina, Virginia Beach, May 13, 1947.

1. Vital Statistics of the United States, United States Public Health Service, Part 1, p. 92, 1944.
2. Calvin, J. K.: Tetanus, in Brennemann's Practice of Pediatrics, Hagerstown, Maryland, W. F. Prior Company, 1945, vol. 2, ch. 27.

over the telephone; the patient was a 10-year-old boy in tetanic spasm, with no fever and a suppurating wound. In atypical, early, or mild cases the diagnosis can be very difficult. Meningitis, spider bites, heat cramps, emotional upsets, tetany, strychnine poisoning, hydrophobia, poliomyelitis, and encephalitis must be thought of in the differential diagnosis.

### *Treatment*

#### *Control of muscle spasm*

The control of muscle spasm is of primary concern, not only to relieve the patient of his agonizing muscle cramps but to prevent asphyxia from severe convulsions and pneumonia from lack of aeration, and to lessen exhaustion. Unnecessary stimuli are to be avoided. The patient should be kept in a comfortable, quiet room free from sudden noises, drafts and visitors. A calm, resourceful nurse should be in constant attendance until convalescence is well established. Numerous sedatives have been tried, and often more than one drug is required during the disease. Avertin(3) is perhaps the most popular because it can be given rectally and can be safely used over a period of days, and because it gives a very prompt response. Another advantage is that the dosage can be varied easily as needed. I start with a dose of 25 or 50 mg. per kilogram of body weight, and then give additional doses of 5 to 25 mg. as they are needed. Experience is necesary to maintain the correct state of sedation so that respiratory movements are deep enough to prevent atelectasis and anoxia. It is very important to differentiate cyanosis due to generalized muscle spasm from respiratory obstruction due to retained secretions. It is better to give a fairly large dose of the sedative, get the correct level of sedation, and then maintain it. A few mild convulsions are preferable to oversedation. In a severe generalized convulsion, intravenous sedation may be required to prevent asphyxiation. Sodium amytal, 5 mg. per kilogram, may be given slowly by vein, as well as by mouth or intramuscularly if indicated. Chloral hydrate and other sedatives are used successfully by some clinicians.

In the search for a drug to control muscle spasm without producing the marked general depression of a sedative, curare appears, theoretically, to be ideal. As long ago as 1867, Demine in France reported 22 cases of tetanus treated with curare, with 8 recoveries. Progress in the use of curare was delayed by the limited supply and the uncertain potency of the drug. During the past few years the drug has become available and accurately standardized. Several reports on the successful use of curare in conjunction with other drugs have appeared in the literature. Experience shows that curare can effectively control muscle spasm in tetanus, and that it offers the advantage of a conscious patient, able to breathe and cough easily and in addition able to move, void, and defecate(4).

Because of the marked variations in the manifestations of tetanus and in the response to curare, the drug should be administered only under the close supervision of an experienced person. Continuous relaxation at or near the level of respiratory paralysis results in hemoconcentration and eventually leads to an irreversible state of shock. The drug may be given intermittently, either intramuscularly or intravenously, in amounts just sufficient to control spasm but not large enough to produce constant muscle relaxation. Bowers of Los Angeles, who has had wide experience in the treatment of tetanus, reports: "In the severest case, we are using Intocostrin for 2 or 3 days to cut down the severity of paroxysms. We have found that in the dosage of 0.68 units per pound of body weight at 6 to 8 hour intervals, there is no danger of respiratory failure with this drug."(5) While curare is being administered, facilities for endotracheal administration of oxygen and artificial respiration should be available(6).

#### *Administration of antitoxin*

After the correct state of sedation has been acquired and the patient has been settled in a comfortable environment with constant medical attention, then and only then should antitoxin be given. Every effort should be made to avoid serum reactions, because of the danger of producing convulsions. The usual history of allergic manifestations or previous serum injections should be obtained. Skin tests and ophthal-

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3. Spaeth, R.: Tetanus, in Tice's Practice of Medicine, Hagerstown, Md., W. F. Prior Company, 1945, vol. 5, pp. 25-47.
4. Cullen, S. C. and Quinn, C. S.: The Use of Curare in the Treatment of Tetanus: Case Report. Surgery 14:256-260 (Aug.) 1943.
5. Bowers, A. G.: Personal communication.
6. West, R.: The Pharmacology and Therapeutics of Curare and Its Constituents. Proc. Roy. Soc. Med. 28:565-578 (March) 1935.

mic tests should be done in routine fashion. It is perhaps well to give atropine and adrenalin before the serum is administered. Allergic patients should receive the serum only intramuscularly, other patients either intramuscularly or intravenously. Intraspinal administration is of historic interest only(7), and should never be used.

There is great difference of opinion as to the correct dose of antitoxin. Although the use of doses larger than 60,000 units cannot be criticized severely, it is probably just additional expense and inconvenience to the patient. Spaeth(8) has demonstrated by titration methods that after a single dose of 60-000 units adequate antitoxin is present in the circulating blood for as long as four weeks. It would therefore seem wise to give the serum in one dose of 60,000 units. If given intravenously, it should be given slowly at room temperature and diluted in saline or glucose solution.

If the patient does not show satisfactory improvement, better control of muscle spasm is usually indicated(9), rather than more antitoxin. Sometimes during the stage of serum sickness muscle spasm may be increased, so that special nursing care should not be discontinued until this danger is passed.

### *Care of the wound*

After the muscle spasm is under control and the antitoxin has been administered, then the wound which has allowed the introduction of the infection demands attention. Fully half of these wounds are healed, and often no one has any memory of the wound. That type of wound requires no care. Wounds which are still unhealed demand the same surgical care as if the patient did not have tetanus. Devitalized tissue should be excised, foreign bodies removed, and free drainage established. Experimental work shows that amputation of the affected extremity as soon as symptoms of tetanus appear does not influence the outcome of the disease. Hence mutilating surgery is definitely contraindicated. It is very important to remember that if surgery is required months later the patient must be protected by either antitoxin or toxoid.

### *Supportive therapy*

General supportive measures are important in tetanus, as it is a very exhausting disease. Because of the danger of aspiration of food given by mouth, all except the mildest cases require intravenous alimentation. Glucose in saline solution, amino acids, plasma, and sometimes blood transfusions are required to maintain the patient. Attention should be paid to oral hygiene, the removal of secretions in the pharynx, and care of the skin. Retention of urine and feces often is troublesome, and catheterization and enemas may be required.

### *Prevention and treatment of complications*

Pneumonia is such a frequent complication that every precaution possible should be taken to prevent its development. The correct state of sedation to allow proper aeration of the lungs, the administration of oxygen and carbon dioxide at intervals to insure deep breathing, frequent changes of position, and removal of secretions from the pharynx are necessary. As these patients often perspire freely, avoidance of drafts and care of the skin are important to prevent chilling. Until the days of sulfonamides and penicillin, the above measures were often inadequate and a patient who would otherwise recover from tetanus would die of pneumonia. Now penicillin should be administered until the patient is definitely convalescing. Since penicillin has an inhibitory effect on the Bacillus tetani *in vitro,* it was hoped that this drug would favorably influence the course of the disease. Clinical studies(10) give no indication that this is true, however. Sulfonamide drugs are equally ineffective.

It is well to have an x-ray of the spine made before the patient leaves the hospital, as compression fractures of the dorsal vertebrae develop in some 20 per cent of the patients with tetanus during severe convulsions. These fractures respond to the usual orthopedic procedures.

## *Prophylaxis Against Future Attacks*

It is important to remember to give tetanus toxoid to any patient who has had antitoxin, as the acquired sensitivity increases the danger of future serum therapy. Tetanus is not an immunizing disease in the human

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7. Dietrich, H. F.: Tetanus in Childhood, with Special Reference to Treatment, Am. J. Dis. Child. 59:693-710 (April) 1940.
8. Spaeth, R.: Serum Therapy of Tetanus, Am. J. Dis. Child. 61:1146-1174 (June) 1941.
9. Albis, F. L.: Program of Treatment of Tetanus, Marquette M. Rev. 11:139-143 (June) 1946.
10. Lewis, L.: Therapeutic Trial of Penicillin in Tetanus, Ann. Int. Med. 25:903-915 (Dec.) 1946.

being, and several cases of second attacks have been reported.

### *Discussion*

**A member:** I would like to ask how often Dr. McLeod recommends repeating the booster doses of tetanus toxoid.

**Dr. McLeod:** Every two years.

**A member:** Have any instances been reported of tetanus occurring in people who have been immunized with tetanus toxoid?

**Dr. McLeod:** In **Lancet** the British give a full report of their experience with tetanus during World War II. Only 10 per cent of their forces were not actively immunized. Some 22 patients were not protected by active immunization. These men developed the disease during the first ten days after the wound. These failures may have been due to an overwhelming amount of toxin or to a defective response of the individual to toxoid.

The antitoxin level rises from the fifth day after the booster dose of toxoid to reach a peak about the tenth day. For this reason the British gave seriously injured patients antitoxin as well as a booster dose of toxoid.

**Dr. C. R. Bugg** (Raleigh): I remember hearing a report on the British soldiers who were caught at Dunkirk. Many of those men had no care of their wounds for a period of eight or ten days. The report stated that, even without booster doses, there wasn't a case of tetanus among the men who had been immunized with tetanus toxoid.

**Dr. A. S. Root** (Raleigh): Dr. McLeod's paper emphasizes the importance of immunizing children against tetanus. Two doses of tetanus alum-precipitated toxoid given a couple of months apart immunize a child probably for life against this disease. I am inclined to think that we pediatricians are not emphasizing the immunization of children against tetanus as much as we should.

**Dr. K. B. Geddie** (High Point): A report on orphanage children immunized against tetanus stated that even after five years the vast majority of the children had enough antitoxin in the blood to prevent tetanus. Although it is customary to give booster doses every two years, I believe that doses at less frequent intervals would still be effective.

**Dr. D. E. Robinson** (Burlington): I think it is particularly important to give tetanus toxoid to children who have shown allergic manifestations of any kind and who have had previous antitoxin. They are likely to have severe allergic reactions to repeated doses of antitoxin.

**Dr. McLeod:** There is considerable difference of opinion about when to give toxoid after recovery from a case of tetanus. Roman in France gives 2 cc. of toxoid with the first dose of antitoxin and repeats the toxoid three times at five-day intervals. Cooke of St. Louis tried this procedure, but felt that from the point of view of the laboratory it wasn't sound. Most authors prefer to wait about three months after the patient recovers from tetanus before giving toxoid.

**Dr. J. C. Knox** (Wilmington): Does the site of the wound make any difference in the mortality from tetanus?

**Dr. McLeod:** There is no difference in the incubation period and no difference in mortality, even with wounds on the face or scalp.

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Over 200,000 disabled veterans of World War II were in educational institutions or job training on Jan. 31 under the Vocational Rehabilitation Act administered by Veterans Administration.

# EXTRACTION OF METALLIC FOREIGN BODIES FROM THE FOOD AND AIR PASSAGES

## *With Special Reference to the Alnico Magnet and Triangulation Fluoroscopy*

V. K. Hart, M.D.

Charlotte

Chevalier Jackson, the pioneer in the extraction of foreign bodies from the food and air passages, was probably the first to use the aid of magnetism in this field(1). He applied it to the chest wall to pull a bullet within reach of the bronchoscopic forceps. No further mention of the use of magnetism appears in the literature until Silber, Kaplan and Epstein(2) in 1944 employed the permanent Alnico magnet in removing a padlock from the stomach.

Since then, Equen(3) has improved and popularized this method of extracting magnetic foreign bodies from the stomach. His improvement consisted in adding a 12 F Levin tube as a cover for the metal stylet attached to the Alnico magnet. The distal or magnet end of the tubing was perforated to allow air to be pumped into the stomach by means of a hand bulb attached to the proximal end (fig. 1.) Air can thus be forced into the stomach, distending the walls and allowing easier manipulation of the magnet. Equen has also designed a smaller bronchoscopic magnet. The metal stylet of this instrument is merely covered with a small ureteral catheter. Insufflation of air is not necessary. Fluoroscopic guidance is required with the use of either magnet.

We have not had an opportunity as yet to use the bronchoscopic magnet. While I am not sure that it will materially improve the well-established methods of handling magnetic foreign bodies of the tracheobronchial

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Read before the Section on Ophthalmology and Otolaryngology of the Medical Society of the State of North Carolina, Virginia Beach, Virginia, May 13, 1947.

From the Charlotte Eye, Ear, Nose and Throat Hospital.

1. Jackson, C.: A Bullet in the Lung; Bronchoscopic Removal with the Aid of Magnetic Fixation, J.A.M.A. 90:1272-3 (Apr. 21) 1928.
2. Silber, S., Kaplan, C. and Epstein, B. S.: The Use of a Permanent (Alnico) Magnet in the Peroral Removal of a Metallic Foreign Body from the Stomach, Ann. Otol., Rhin. & Laryng. 53:589-594 (Sept.) 1944.
3. Equen, M.: (a) A New Magnet for Foreign Bodies in the Food and Air Passages, J.A.M.A. 127:87-88 (Jan. 13) 1945; (b) The Alnico Magnet—An Aid to Bronchoscopy and Esophagoscopy, Ann. Otol., Rhinol. & Laryng. 54:178-182 (March) 1945; (c) Magnetic Removal of Foreign Bodies from the Food and Air Passages under Fluoroscopic Guidance, South. M. J. 38:245-246 (April) 1945.

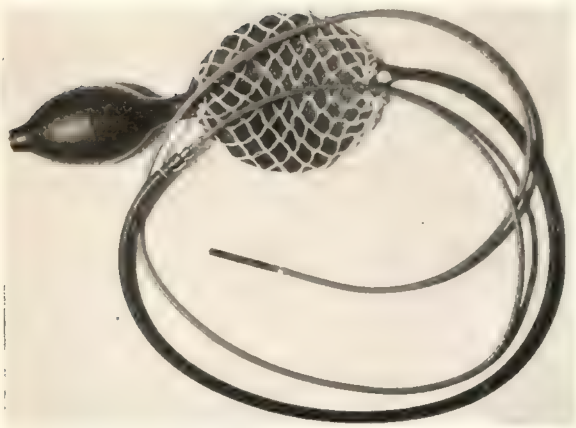

**Fig. 1. Photograph of Alnico magnet apparatus as modified by Equen.**

tree, I am keeping an open mind until I have had personal experience with its use.

### *The Hazard of Foreign Bodies in the Stomach*

That the presence of the larger metallic foreign bodies in the stomach does carry a hazard is illustrated by this personal experience. A child, 2 years of age, was sent to me with a large nail in the stomach. This was in the early days of the Alnico magnet. I immediately called Dr. Equen, and he was good enough to send his magnet to me by air mail. In the short time which elapsed before its arrival, the nail became impacted in the duodenum.

I felt that the child should be given a chance to evacuate the nail spontaneously. For economic reasons, she was sent home under the observation of a very excellent general surgeon. The nail did not move appreciably, and was removed by abdominal section. Despite every care and large doses of chemotherapeutic agents, the child died. I am sure that her life would have been saved if the magnet had been available when the patient was first seen.

### *The Use of the Alnico Stomach Magnet*

Many metallic foreign bodies in the stomach, even if large, will be uneventfully passed by older children. In our experience, however, if they are of any size at all, such objects are apt to hang at the pylorus or become impacted there in babies under 18 months of age. In this age group, any surgical procedure carries a large risk. Therefore, we welcome in the Alnico magnet a simple, safe method of removal, if we are fortunate enough to have a magnetic foreign body. The hazards of removal are greatly reduced. The patient is little taxed, and extraction as a rule is relatively simple and rapid. We have used no anesthesia. We have also found that neither biplane fluoroscopy nor triangulation fluoroscopy is required for the successful use of the magnet in the stomach. However, the usual bronchoscopic table and fluoroscope are necessary adjuncts for this procedure.

### *Case reports*

The use of the Alnico magnet in the stomach is illustrated by the following case reports.

#### Case 1

Our first case was a 7-month-old baby who had swallowed an open safety pin about forty-eight hours before we saw him. X-ray examination (fig. 2) showed a medium-sized open safety pin in the stomach.

The child was placed on the bronchoscopic table in the x-ray room. No anesthesia was given. By means of a laryngoscope the Alnico stomach magnet was passed into the esophagus and then into the stomach. The stomach was gently inflated, and almost immediately contact was made with the safety pin, which proved to be magnetic. At first the keeper became attached to the magnet, so that the point was left up—an undesirable position. By rotating and moving the magnet, all under fluoroscopic guidance, we were able to manipulate the pin until the point was trailing. It was then gently pulled up into the esophagus. As was anticipated, it pulled off at the cricopharyngeus. A laryngoscope was then introduced, the larynx elevated, and the spring end of the pin brought into view. This was seized with ring forceps and extracted.

The baby has remained well since.

#### Case 2

A 15-month-old baby was seen two hours after the ingestion of an open safety pin. There was a humorous aspect to this case: The child had attended a party at which pastry diapers were served; each contained a safety pin!

A roentgenogram (fig. 3) showed a small, open, safety pin in the stomach. In spite of its small size, we thought it best to remove it, since the baby was only 15 months of age. A duplicate proved to be magnetic.

Prior to operation the child was given ⅛ grain of codeine and 1 grain of sodium luminal. The hypopharynx was exposed with a small spatula and the magnet was passed into the esophagus. Under fluoroscopic guidance, we were able to make contact with the pin. However, the point was up. Because of the small size of the pin, it was with considerable difficulty that we were able to reverse the point into a trailing position. The pin was then carefully drawn up into the esophagus. When the cricopharyngeus was approached, the spatula was reintroduced. With the tubing of the magnet through the spatula and the cricopharyngeus elevated so as to relieve spasm, the pin was then withdrawn with a trailing point.

There were no complications.

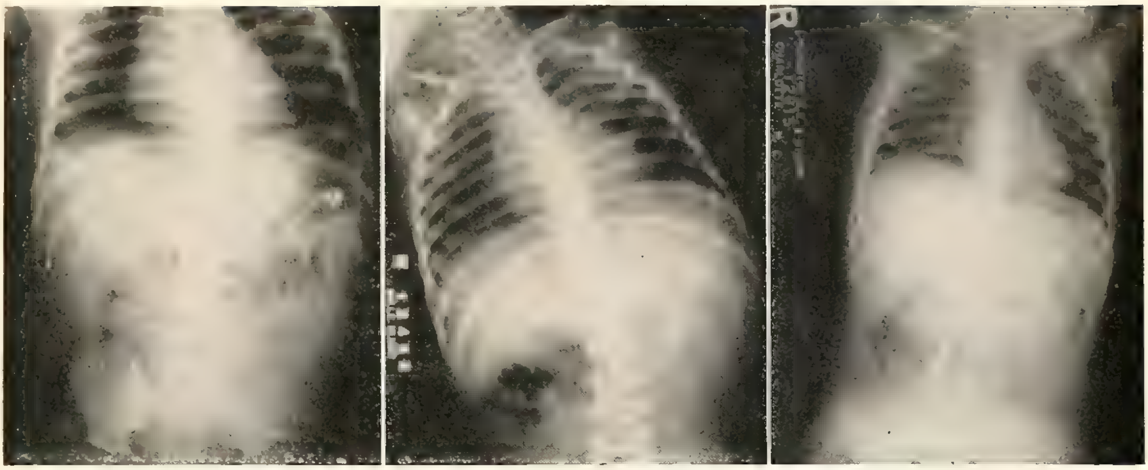

**Fig. 2 (Case 1). Open safety pin in the stomach of a 7-month-old baby. Fig. 3 (Case 2). Open safety pin in the stomach of a baby 15 months of age. Fig. 4 (Case 4). Large nail in the stomach of a baby 15 months of age. All these foreign bodies were successfully extracted with the Alnico magnet.**

**Case 3**

This baby was 2½ years of age and was seen four hours after swallowing an open safety pin. X-ray examination revealed a medium-sized open safety pin in the pyloric end of the stomach.

Without anesthesia, the magnet was passed through a laryngeal spatula into the esophagus. Under fluoroscopic guidance, and with some inflation, we were finally able to get the magnet into the pyloric end, where immediate contact with the pin was made. The pin proved to be magnetic and was drawn to the cardia, where the point presented. By rotating and shaking the magnet, however, we were able to reverse the point into a trailing position. The pin was then gently pulled upward. It came off either at the cricopharyngeus or in the mouth. A laryngeal spatula was immediately introduced. The pin was found lying in the hypopharynx with the spring end presenting. This end was seized with ring forceps and the pin was extracted.

The patient had an uneventful convalescence.

**Case 4**

A baby 2 years of age was seen two hours after swallowing a nail. The roentgenogram (fig. 4) showed a large nail in the stomach.

Following sedation with 1 grain of sodium luminal and ¼ grain of codeine, the hypopharynx was exposed with a spatula and the stomach magnet was introduced. By a little manipulation under fluoroscopic guidance, we were able to make contact with the head of the nail. The nail was withdrawn without difficulty, and proved to be about two inches in length.

The baby returned home in good condition shortly after the operation.

**Case 5**

This 4-year-old child was also seen two hours after the ingestion of a nail. An x-ray film (fig. 5) showed a slightly bent nail in the pylorus of the stomach.

Following the administration of 2 grains of sodium luminal and ¼ grain of codeine, the magnet was passed into the stomach with the help of a laryngeal spatula. Under fluoroscopic guidance, immediate contact was made with the head end of the nail, which had apparently been regurgitated higher into the stomach by vomiting. The nail was extracted without difficulty, and recovery was uneventful.

**Case 6**

A 3-year-old baby swallowed a bobby pin three hours before admission. X-ray examination (fig. 6) revealed a large bobby pin in the stomach.

The patient was given 2 grains of sodium luminal and ¼ grain of codeine, and was then taken to the x-ray room, where the whole procedure was done under fluoroscopic guidance. By means of a laryngeal spatula, the Alnico magnet was passed into the stomach. The stomach was then ballooned with air, and the bobby pin was immediately picked up in the long axis. We were thus able to extract it without difficulty. There were no complications.

## *Other Methods for Extracting Foreign Bodies from the Food Passages*

### *Extraction through the esophagoscope*

Since only 10 per cent of foreign bodies are magnetic(1), and since most safety pins are now made of plastic and are therefore inert, the older methods for extracting foreign bodies from the food passages must often be utilized. If the pin is one of the larger sizes, is in the esophagus, and is nonmagnetic, I prefer endogastric version through the esophagoscope. The keeper shank is straddled with ring forceps, so that a rigid and dangerous grip is avoided. The pin is taken with trailing point into the stomach, and there reversed by manipulation. Peroral extraction is then done with the point trailing.

In my opinion, however, the introduction of a rigid metal esophagoscope into the stomach is a risky procedure in an infant. If the foreign body is toward or in the pylorus, the instrument must be swung to the left by rotating the head to the left. This maneuver involves considerable pressure on

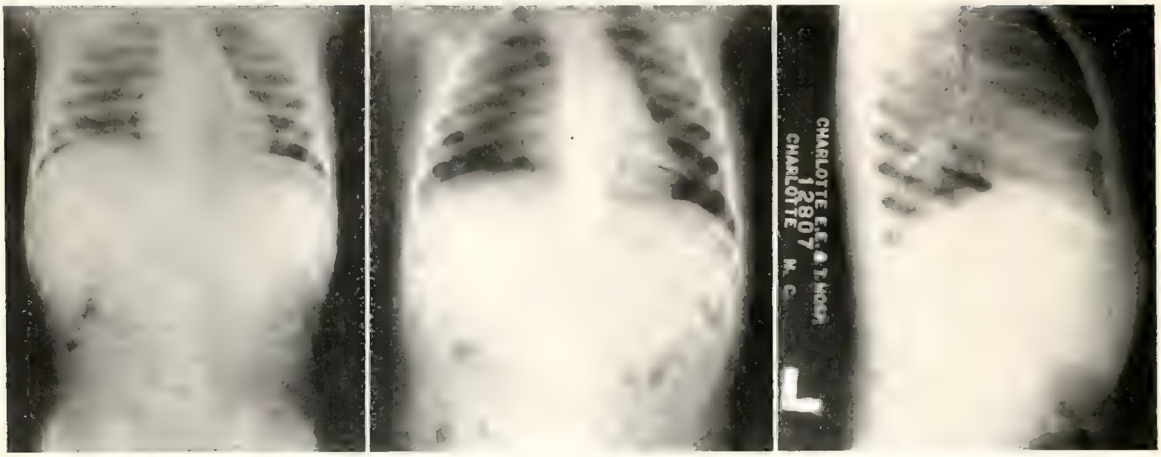

**Fig. 5 (Case 5). A nail, with slightly bent head, in the pylorus of a 4-year-old child, lying immediately over and anterior to the spinal column. Extraction was done with the Alnico magnet. Fig. 6 (Case 6).A large bobby pin in the stomach of a 3-year-old baby. This was easily removed with the Alnico magnet. Fig. 7 (Case 8). This lateral film of a baby 2½ years of age shows a small bronchoscopic forceps blade in a posterior branch bronchus of the right lower lobe. This was beyond bronchoscopic vision, but was successfully removed with the aid of triangulation fluoroscopy.**

the mediastinum, which is increased by the necessary inflation of the stomach by air. The only fatality I have ever had as the result of an attempt to remove a foreign body from the stomach followed such manipulation. Death was probably caused by bilateral spontaneous pneumothorax.

### *Surgery*

Certain principles in the surgical removal of a foreign body from the stomach deserve emphasis. The incision should be quite small. If the surgeon can feel the foreign body through the stomach wall, he may be able to manipulate it externally to the opening and remove it. The foreign body is not always easily located, however, and endoscopic visualization through the incision may be necessary.

If undue difficulty is encountered in locating the object, it may be wise to do a gastrostomy rather than subject a baby to unnecessary shock. After two weeks, it is amazing how well babies will tolerate endoscopy through the gastrostomy opening. We use this retrograde method constantly in severe lye burns of the esophagus, to get a string through into the mouth. I have never resorted to gastrostomy for the removal of a foreign body, but I think it might be applicable and perhaps life-saving in some cases.

We may often save the life of even a small baby by good judgment and patience. We must remember that the thick-walled stomach may tolerate even a sharp foreign body for several weeks. The esophagus, on the other hand, is very thin-walled and easily perforated. Foreign bodies must therefore be removed early from the esophagus in order to prevent a mediastinitis. Should this eventuality occur, however, it should be remembered that surgical drainage of the upper mediastinum is now a well-standardized operation.

Another case report serves to illustrate the principles of treatment just discussed.

### Case 7

A 6-month-old baby had had a large open safety pin in the esophagus for several days. There had been bleeding, and the patient was admitted with a fever of 103 F. In an attempt to do a version on the pin, it was lost in the stomach. The baby was too ill for further manipulation.

Since we were faced with an impending acute mediastinitis, neck drainage of the upper mediastinum was immediately done under general anesthesia. Although frank pus was not encountered, the temperature subsided and the baby's condition improved promptly. The pin remained in the stomach for several weeks, and was then successfully removed by a general surgeon. Uneventful convalescence followed.

### *The Use of Triangulation Fluoroscopy*

Credit for the application of triangulation fluoroscopy to foreign body problems should go entirely to W. E. Roberts of our x-ray department. Since he has already published an article covering the details(4), my remarks on this subject will be brief.

Heretofore, biplane fluoroscopy has been used to visualize opaque foreign bodies be-

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4. Roberts, W. E.: Direct Visual Guidance, Triangulation Roentgenoscopy for the Removal of Opaque Foreign Bodies. Am. J. Roentgenol. 52:327-331 (Sept.) 1944.

yond endoscopic vision. This method necessitated the use of two tubes and two screens. In triangulation fluoroscopy, two tubes and a single screen are used. Thus two foreign bodies and two pairs of forceps are seen by the roentgenologist. By their relationships, he can tell the bronchoscopist when the forceps are in the same plane as the foreign body both horizontally and vertically. He then directs seizure of the foreign body.

The use of this method can best be illustrated with a case report.

Case 8

A 2½-year-old child had had a nail removed from the right lung one week previously by a capable and experienced bronchoscopist. Unfortunately, in removing the nail, my colleague had broken a bronchoscopic forceps blade. This disappeared and could not be visualized by subsequent bronchoscopy. X-ray examination, however, showed the blade to be in the right lung. The patient was then referred to our clinic for further study and treatment.

After admission, additional x-rays were made in the posterior-anterior and lateral positions (fig. 7). These showed a small forceps blade, apparently in one of the posterior branches of the right lower lobe.

A tracheotomy had been done by the first surgeon. The baby was taken to the operating room, and without anesthesia a 3½ mm. bronchoscope was introduced through the tracheal opening. There was still some swelling in the lower right bronchus, and the subdivisions could not be well visualized. No foreign body was seen.

The special fluoroscopic and bronchoscopic apparatus was then prepared in the x-ray department. The patient was given a hypodermic containing 1 grain of sodium luminal and ¼ grain of codeine sulfate. The child was then placed in the proper position and a 3½-mm. bronchoscope was again introduced through the tracheal wound without anesthesia. Using triangulation fluoroscopy, we were able to identify the correct bronchus, and after working about one-half hour were able to seize the broken piece. The first seizure was too near the mid-portion, however, and the foreign body could not be safely withdrawn. It was then released and reseized near the end and withdrawn. It proved to be one whole blade as indicated in the x-ray.

The patient was dismissed the following day in good condition.

### *Summary*

Some of the newer methods employed in the endoscopic removal of foreign bodies of the food and air passages have been briefly reviewed. Particular emphasis was given to the use of the Alnico magnet in extracting magnetic foreign bodies from the stomach. Six cases in which this method was successfully employed were described. The objects removed included three open safety pins, two nails, and one bobby pin.

The use of triangulation fluoroscopy as developed in our clinic was also described briefly. This method is especially applicable to small opaque foreign bodies in branch bronchi beyond bronchoscopic vision. One illustrative case was reported.

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## RECENT ADVANCES IN THE TREATMENT OF CARDIOVASCULAR DISEASE

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Two years ago the recent and most important advances in the treatment of cardiovascular disease were surveyed(1). Since this report was published, significant progress has been achieved, many hopes have been fulfilled, and a few radical changes in our ideas of therapy have been made. It is proposed now to present a brief review of some of the newer concepts in which the greatest contemporary interest has been manifest.

### *Bed Rest*

In recent years much attention has been drawn to the inadvisability of prolonged bed rest in the treatment of both medical and surgical conditions. The deleterious effects of bed rest in congestive heart failure and myocardial infarction have been emphasized, particularly by Harrison, Levine, and Dock(2). There is little doubt that the patient with congestive heart failure is more comfortable in a large bed with the head elevated, or in a large easy chair provided with arm rests, than in any other position. In myocardial infarction the period of bed rest has now been reduced in most instances from two months to four to six weeks. Shorter periods of bed rest are endured more easily, thrombo-embolic phenomena are decreased, and no harm accrues to the patient.

More recently consideration has been given to the importance of early ambulation

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Read in part at the Second General Session, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

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in rheumatic fever and of physical reconditioning after the subsidence of the infection(3), in order to prevent neuroses, principally of the anxiety type, and to forestall physical invalidism.

### *Treatment of Ectopic Rhythm Disturbances*

For the treatment of ectopic rhythm disturbances, quinidine(4) is unquestionably the most useful single drug. The newly reported development of a method for determining the plasma concentration of quinidine(5) should aid materially in adjusting dosage schedules and in insuring more uniform and desirable results. Askey(6) has challenged the accepted belief that quinidine is contraindicated in auricular fibrillation associated with congestive heart failure. Collective statistics reveal that the risk of eventual embolism is 15 to 20 per cent in patients with untreated auricular fibrillation and only 4 per cent when quinidine is used therapeutically. The risk of sudden death is, however, slightly higher for patients receiving quinidine in the presence of heart failure than for untreated patients. Askey advocates an attempt to restore normal rhythm, particularly in those desperately sick individuals whose auricular fibrillation and failure continue uncontrolled by the standard medical procedures, including complete digitalization.

The recent literature contains a number of reports on the use of various drugs for the control of ectopic rhythm disturbances—for example, lanatoside C in paroxysmal tachycardia(7) and auricular flutter(8), prostigmine in combination with mecholyl(9), potassium acetate in auricular fibrillation(10), quinidine(11) and magnesium sulfate(12) in ventricular tachycardia, paredrine hydrobromide(13), and finally intravenous procaine(14) for arrhythmias arising during anesthesia. Although mercury, in its various forms, is the most potent diuretic available when given intravenously, Batterman, de Graff, and their associates(15) have shown also that it may be safe and effective when given orally. An appreciation of the toxic effects of the mercurial diuretics is demonstrated by several recent communications(16). Pines(17) and his associates have made the important suggestion that magnesium sulfate be added to the mercurial diuretic, if it is to be given intravenously, both to prevent fatalities and to enhance the diuretic effect of the drug.

### *Treatment of Congestive Heart Failure*

Digitalis remains the most effective single therapeutic agent in the treatment of congestive heart failure(18). While in general the oral administration of the whole-leaf digitalis in tablet form is satisfactory and effective, well deserved interest has been aroused in the isolation and practical application of

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6. Askey, J. M.: Quinidine in the Treatment of Auricular Fibrillation in Association with Congestive Failure, Ann. Int. Med. 24:371-384 (March) 1946.
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the cardiac glycosides(19), which in essence are the potent active principles of digitalis leaf. The development of these purified preparations for clinical use represents the most significant advance in digitalis therapy. The digitalis glycosides have distinct advantages over digitalis leaf in that they may be assayed gravimetrically rather than biologically and thus may be prescribed accurately in terms of weight of the drug rather than by "cat" or "digitalis units." An additional advantage is that oral and intravenous digitalization may be accomplished more rapidly than with digitalis leaf.

The most important member of this group of cardiac glycosides is digitoxin, which has a potency 1,000 times that of digitalis; 0.1 mg. of digitoxin is equivalent in potency to 0.1 Gm. of digitalis. It is the only member of the digitalis group that is completely absorbed when given orally, so that the dosage required for complete digitalization is identical whether the drug be administered orally or intravenously. While the entire digitalizing dose (average dose 1.2 mg.) may be exhibited as a single dose with little evidence of intoxication(20), it is preferable to divide the dose into two equal portions given six hours apart. The daily maintenance dose varies from 0.1 to 0.2 mg. Because digitoxin is excreted slowly, the conversion from intravenous administration to oral maintenance may be accomplished without difficulty.

While considerable research has been devoted to a number of other cardiac glycosides(21)—digilanid, digoxin, and Strophanthin K—, the physician should familiarize himself with two additional preparations which have proved valuable for rapid intravenous digitalization. Ouabain (crystalline G-Strophanthin) is inert when given orally, but when administered intravenously it exerts initial effects in ten to twenty minutes and maximal effects in two hours. The disadvantage of this preparation lies in its rapid excretion; some other type of digitalis must be used for maintenance purposes. Similarly lanatoside C is useful intravenously because of its rapid action, the full effect being reached in about four hours; it too, however, is rapidly excreted, and a transfer to other digitalis preparations is advisable for maintenance purposes.

Recent studies of fluid dynamics in congestive heart failure(22) have served to modify radically former opinions concerning the importance of diet and fluid intake in those patients exhibiting edema(23). It is now agreed and accepted that the most important item in the dietary regimen is the content of sodium, for an excess of sodium salts leads to fluid retention. Sodium retention occurs in congestive heart failure, presumably as the result of inadequate blood flow through the kidney. When the sodium in the diet is maintained at very low levels (0.5 to 1 Gm. per day), fluid restriction becomes unnecessary and irrational, because large amounts of fluid are easily tolerated by the patient. It is common experience that thirst is produced when fluids are restricted to less than 1500 cc. per day; on the other hand, abdominal discomfort arises when the oral intake of fluids exceeds 3000 cc. per day. It seems judicious to allow a "free fluid intake," so that 1700 to 2500 cc. of fluid will be ingested per day. This amount will insure adequate urinary excretion.

A more radical concept in the dietary management of edema has been offered by

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Schemm(24), who proposes a slightly acid-ash diet, supplemented by ammonium chloride and hydrochloric acid, as well as a forced-fluid regimen in which 3000 to 8000 cc. per day are given both orally and parenterally. The rationale of this method of treatment is based upon the fact that an acidifying program favors the excretion of sodium through the kidneys and that water itself is a useful and potent diuretic. While this dietary and acidifying regimen enjoys extended use now, the forced-fluid regimen has not been accepted very generally.

### *Treatment of Rheumatic Fever*

During the past several years much work has been done in the field of rheumatic fever. In spite of a considerable amount of research, the etiology of rheumatic fever remains obscure. Evidence has been presented, however, to indicate that hypersensitivity(25) may well underlie the pathology of rheumatic fever. There is now fairly general agreement(26) that sensitivity to group A hemolytic streptococci represents the important prelude to the development of rheumatic fever. Heredity and environment(27) are other important factors. It has been demonstrated that the sulfonamide drugs will prevent respiratory infections due to hemolytic streptococci, and thus decrease recurrences of rheumatic fever in susceptible subjects(28). The appearance of sulfonamide-resistant strains of streptococci has been the inevitable result of widespread suppressive prophylaxis(29). It has been established that the sulfonamide drugs, as well as penicillin, have no value in the treatment of the acute phase of rheumatic fever; moreover, either drug actually may aggravate the infection.

Following the suggestion of Coburn(30) with reference to the use of large doses of salicylates in order to suppress the allergic and inflammatory manifestations of rheumatic fever and thus decrease the amount and severity of resulting cardiac damage, much work has been done(31). It would appear to be the consensus that large-dose salicylate therapy is of value in controlling the exudative phenomena of the acute attack, but that such therapy has little influence in forestalling the progress of the disease process or in preventing the subsequent development of cardiac damage. No significant advantage is gained by the intravenous use of the drug, except for more rapid action initially. Sodium bicarbonate should be administered in moderate doses concomitantly with the salicylates. Intoxication(32) from the salicylates is a frequent sequel to large-dose therapy. Of interest are the recent observations(33) that hyaluronidase derived from hemolytic streptococci will increase the diffusion of a

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dye injected intradermally and that salicylate will inhibit this action by at least 50 per cent. This finding suggests that the action of the salicylates upon the exudative phenomena of rheumatic fever is more specific than was appreciated formerly. The clinical demonstration that para-aminobenzoic acid(34) administered simultaneously with salicylates will increase the concentration of the latter drug in the blood indicates its possible utility in those instances where inadequate salicylate concentrations are attained after large-dose therapy.

Since the sedimentation rate(35) may be decreased specifically by salicylate treatment, it is of less value than the Weltmann reaction(36) as an index of activity of the rheumatic infection.

In the event of salicylate sensitivity or failure, acceptable substitutes are available in the forms of aminopyrine and certain succinate derivatives(37).

### *Penicillin*

#### *In bacterial endocarditis*

The greatest current achievement in the medical treatment of heart disease has been the practical application of penicillin to the therapy of bacterial endocarditis. This disease, considered ten years ago to be almost universally fatal, was cured during the ensuing few years by various types of sulfonamide therapy in only 5.5 per cent of a large series of patients. Since 1944, the prognosis for bacterial endocarditis has been completely altered by antibiotic therapy. A review of most of the larger series of reported cases(38) reveals that, of a total of 507 patients treated by penicillin, 342 or 67 per cent have recovered. The recovery rate after the administration of penicillin alone was 64 per cent (264 of 412 patients), while that following supplementary anticoagulant therapy in the form of heparin or dicoumarol was 68 per cent (65 of 95 patients). The addition of the anticoagulant, therefore, has not significantly altered the final therapeutic results. The dangers(38s,39) inherent in its use are sufficiently great to suggest its re-

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The various techniques of administration of penicillin have not demonstrated any individual superiority; with the use of continuous intravenous drip 67 per cent recovered (155 of 230 patients), with continuous intramuscular drip 58 per cent recovered (7 of 12 patients), with intermittent intramuscular injection at one- to three-hour intervals 66 per cent recovered (132 of 201 patients), and with varied combinations of the above types 73 per cent recovered (48 of 64 patients). The disadvantages of each method must be appreciated, and the patient's comfort should be the deciding factor in selecting and altering the mode of administration. The daily dosage of penicillin is, however, of paramount importance and depends to a large extent upon the sensitivity of the organism to the drug. Preliminary *in vitro* sensitivity tests therefore should be performed in each instance where laboratory assistance is available. Recoveries are reported following the administration of penicillin in daily doses varying from as little as 40,000 units to as high as 10,000,000 units(38g,u;40a). Where the offending organism has been sensitive, 200,000 to 500,000 units of penicillin per day generally have sufficed to provide cure; but when the organism has been resistant, a million or more units per day have been required. It has been suggested(38b,p) that the penicillin level in the blood be maintained at four to ten times the *in vitro* sensitivity level. If adequate concentrations cannot be attained with penicillin alone, the concomitant administration of para-aminohippurate(40) may aid in reaching the desired level. In view of the availability and low cost of penicillin at present, it seems reasonable to recommend that each patient with bacterial endocarditis be given at least 500,000 units per day, and if the organism reveals resistance *in vitro*, not less than 1,000,000 units per day. There is incomplete agreement upon the duration of treatment. Advised schedules have differed between extremes of two weeks and two months, with general opinion favoring an intermediate course of four to six weeks of treatment, depending upon the total response of the patient. The fact that the infecting bacteria may become increasingly resistant to penicillin must not be forgotten in the initial plan of the daily as well as the total dosage of the drug.

*In cardiovascular syphilis*

Insufficient time has elapsed to evaluate the therapeutic efficiency of penicillin in the treatment of cardiovascular syphilis(41), although this antibiotic has been shown to be effective in the treatment of primary and secondary lues as well as of neurosyphilis. Great caution should be exercised in its use for syphilis of the vascular system, since it may give rise to therapeutic shock of the Herxheimer type, similar to that following arsphenamine.

### *Treatment of Coronary Artery Disease*

During the past several years little of practical value has been added to the therapy of coronary artery disease(42). The sedatives, xanthines, and nitrites, along with restricted activity, continue as the most popular measures in the therapy of angina pectoris. While papaverine is effective in coronary thrombosis(43) with myocardial infarction, it has little effect upon angina pectoris. When given intravenously it is potentially fatal(44). Similarly it should be emphasized that aminophyllin(45) given intravenously may cause severe shock-like reactions and even death, particularly in patients with myocardial infarction or congestive heart failure. The introduction of the anti-thyroid drugs, such as thiouracil, very naturally suggested their use in decreasing the metabolic demands made upon the heart by the tissues in the hope of reducing the pain of angina pectoris by a

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"chemical thyroidectomy." While enthusiastic reports of results have been published by some(46), it is felt by others(47) that these drugs will be useful principally in the treatment of those patient exhibiting initially elevated metabolisms. Nicotinic acid(48), which possesses vasodilating properties, is valueless in controlling the pain of coronary insufficiency. Additional experiences with testosterone(49) have revealed its potentialities in relieving chest pain associated with the male climacterium, but its value in the treatment of angina pectoris is debatable. While cobra venom(50) will control temporarily the pain of coronary insufficiency and increase the patient's ability to exercise, it has no effect upon the evidence of coronary insufficiency which can be demonstrated electrocardiographically by a standard exercise test. The controversy regarding the use of digitalis(51) in patients with myocardial infarction remains unsettled. From personal experiences, I believe that when congestive heart failure supervenes as a complication, digitalis is indicated. Caution must be observed, however, since the myocardium is made more irritable by virtue of the acute muscle degeneration.

A new and probably valuable asset in the therapy of coronary thrombosis with myocardial infarction is the practical development of anticoagulant therapy(52) in the form of heparin and dicoumarol. Interest in these drugs has centered about their value in acute arterial and venous thrombosis and the accepted clinical fact that thrombo-embolic phenomena(53) are common following coronary thrombosis with infarction. Since dicoumarol may be administered orally over prolonged periods at low cost, it has been the drug of choice. Observations reported by Wright(54), Peters and his associates(55), and Nichol and Page(56) indicate that the incidence of thrombo-embolic phenomena following coronary thrombosis has been reduced as compared with previous reported statistics. No large series of control cases untreated by dicoumarol has been followed concurrently, but the preliminary results have been sufficiently encouraging to warrant further extensive trials of the anticoagulant drugs. Because dicoumarol requires about forty-eight hours for its effect to become manifest, heparin may be used for an immediate response. A preparation of heparin(57) for subcutaneous use, possessing rapid and relatively prolonged action, is now available. No recent experiences have been reported with reference to those surgical procedures designed to increase the blood flow to heart muscle, such as cardiomyopexy, cardio-omentopexy, and cardiopericardiopexy. A new method for the treatment of coronary disease, however, has been proposed by Fauteux(58)—pericoronary neurectomy combined with ligation of the great cardiac vein. This procedure is designed to interrupt surgically all afferent pain fibers arising from the myocardium and coronary arteries, as well as to increase the blood supply to the myocardium. The number of patients who have been submitted to this operative technique is too few to permit the formulation

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of an opinion regarding its ultimate usefulness.

### *Treatment of Hypertension*

Since the ingenious demonstrations of Goldblatt and his associates that hypertension can be produced in the experimental animal by renal ischemia, an enormous amount of investigative work has been devoted to the determination of the underlying mechanisms and of their possible relationship to primary or essential hypertension in man(59). The renal pressor system which can be demonstrated in the hypertensive experimental animal has not been shown to exist in human hypertension. It is the consensus at present that these experimental observations do not explain or solve the problem of the pathogenesis of human "essential" hypertension(60). As Smith(61) has pointed out, "So far as the genesis of essential hypertension is concerned, the kidney appears to be the victim rather than the culprit."

#### *By drugs*

The continued search for kidney extracts capable of reducing human hypertension has proved fruitless(62). No new and practical drugs have been advanced for the treatment of hypertension. The thiocyanate(63) drugs remain the most popular ones in general use, along with other conservative measures. Toxic manifestations of the thiocyanate series should be fully appreciated, since fatal poisoning(64) may ensue. Recently thrombophlebitis(65) as well as hypothyroidism and mild myxedema(66) resulting from thiocyanate administration have been reported in the literature. The use of hesperidin(67) and rutin(68) is of possible value in the control of capillary fragility and capillary hemorrhage in hypertension. The new drugs, tetraethylammonium bromide and chloride(69), which produce blockade of the autonomic ganglia in man are of limited value in hypertension, since their effects are quite transient. The principal benefit to be derived is a momentary reduction of blood pressure in the acute hypertensive state.

#### *By diet*

Further experiences with the use of the rice regimen are noted by Kempner(70), who reports that approximately 62 per cent of patients with essential hypertension are improved by this high-carbohydrate, low-protein, low-fat, salt-free diet with restriction of fluids. Grollman and his associates(71) have reported the efficacy of sodium restriction in the diet of a small group of hypertensive patients. The rationale underlying such regimens is not clearly established, and further investigation with respect to the underlying pathologic physiology(72) is indicated. The results of irradiation of the pituitary gland in a series of 92 hypertensive patients who exhibited positive blood tests for antidiuretic substances are reported by Pendergrass(73) and his associates. Approximately 50 per cent manifested definite improvement in their clinical condition and blood pressure.

The statistics of Levy, Hillman, Stroud, and White(74) emphasize quite clearly the necessity for careful follow-up of all indi-

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viduals exhibiting transient elevation in blood pressure, since sustained hypertension develops more frequently in the patient with transient hypertension than in the normotensive individual.

*By surgery*

Increasing interest has been manifested in the surgical treatment of hypertension. The main objective of surgery has been the abolition of vasoconstrictor tone of the peripheral arterioles by surgical interruption of the efferent nervous pathways mediated through the sympathetic nervous system. Recent observations of the results of such surgical treatment have been reported by Peet(75), Smithwick(76), de Takats and his associates(77), Poppen and Lemmon(78), Palmer(79), and Grimson(80). Peet employs a supradiaphragmatic splanchnicectomy and lower dorsal ganglionectomy in which there is bilateral removal of the tenth, eleventh, and twelfth thoracic sympathetic ganglia, the lesser splanchnic nerves, and 9 to 13 cm. of the greater splanchnic nerves. Since 1933, Peet states, 1500 patients have been subjected to this operative procedure. In his initial report satisfactory results were given as better than 50 per cent. In a more recent communication results in a series of 437 patients followed for periods varying from five to twelve years are reported. Of these, 251 patients are living five to eleven years after operation. Of those living 81.3 per cent have a satisfactory lowering of blood pressure (20.3 per cent to normal); 12.7 per cent are unchanged; and in 6 per cent the blood pressure has actually increased. During this period 186 patients died (35.2 per cent). Of the total series, 46.7 per cent obtained a satisfactory result at the end of the five-year follow-up period. Of the patients who succumbed, 49 per cent had malignant hypertension.

The Smithwick technique embodies a more extensive transdiaphragmatic splanchnicectomy and lumbo-dorsal sympathectomy which at most involves removal of the sixth dorsal through the third lumbar ganglia, inclusive, but usually includes only the eighth dorsal through the first or second lumbar ganglia. In a six-year period over 600 unselected patients were submitted to this operation, with a total mortality of 7.8 per cent. The operative mortality was 2.2 per cent, deaths within one year 2 per cent, and deaths one or more years after operation 3.6 per cent. Smithwick reports that 60 per cent of the group are significantly improved; in 42 per cent the diastolic blood pressure was lowered 30 mm. of mercury or more, and in 18 per cent the diastolic pressure was lowered 20 to 29 mm. of mercury. Of doubtful significance is a third group of 20 per cent in which the blood pressure was lowered 10 to 19 mm. of mercury. It is to be noted that these figures refer only to changes in the diastolic pressure level in the horizontal position following operation. Surprisingly enough, no close correlation was observed between the postoperative effect upon the blood pressure and the grade of renal arteriolar damage measured from renal biopsy specimens taken at the time of operation. Smithwick concludes that an adequate surgical procedure upon the autonomic nervous system is of definite therapeutic value in the management of hypertension. That the effect of sympathectomy on the blood pressure is not dependent upon a simple non-specific surgical procedure(81) has been demonstrated by comparative statistics. While he suspects that the operative result is due to decrease in muscle tone and thereby in peripheral resistance, it is not known whether this decrease is due to a modification of neurogenic vasoconstriction or to a change in a humoral mechanism as yet unknown.

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74. (a) Levy, R. L., White, P. D., Stroud, W. D., and Hillman, C. C.: Transient Hypertension. The Relative Prognostic Importance of Various Systolic and Diastolic Levels, J.A.M.A. 128:1059-1061 (Aug. 11) 1945; (b) Levy, R. L., Hillman, C. C., Stroud, W. D. and White, P. D.: Transient Hypertension: Its Significance in Terms of Later Development of Sustained Hypertension and Cardiovascular-Renal Diseases. J.A.M.A. 126:829-833 (Nov. 25) 1944.
75. (a) Peet, M. M. and Isberg, E. M.: The Surgical Treatment of Arterial Hypertension. J.A.M.A. 130:467-473 (Feb. 23) 1946; (b) Peet, M. M.: Results of Bilateral Supradiaphragmatic Splanchnicectomy for Arterial Hypertension. New England J. Med. 236:270-277 (Feb. 20) 1947.
76. Smithwick, R. H.: (a) Surgical Treatment of Hypertension: The Effect of Radical (Lumbodorsal) Splanchnicectomy on the Hypertensive State of One Hundred and Fifty-Six Patients Followed One to Five Years. Arch. Surg. 49:180-193 (Sept.) 1944; (b) Experiences with the Surgical Treatment of Essential Hypertensive Cardiovascular Disease in Man. Cleveland Clin. Quart. 12:105-117 (Oct.) 1945; (c) Surgical Treatment of Hypertension: Some Circumstances Under Which Lumbodorsal Splanchnicectomy Appears to be Inadvisable in Hypertensive Patients. New York State J. Med. 44:2693-2700 (Dec. 15) 1944.
77. de Takats, G., Graupner, G. W., Fowler, E. F., and Jensik, R. J.: Surgical Approach to Hypertension: Second Report. Arch. Surg. 53:111-163 (Aug.) 1946.
78. Poppen, J. L. and Lemmon, C.: The Surgical Treatment of Essential Hypertension. J.A.M.A. 134:1-9 (May 3) 1947.
79. Palmer, R. S.: Medical Evaluation of the Surgical Treatment of Hypertension. J.A.M.A. 134:9-14 (May 3) 1947.
80. Grimson, K. S.: The Surgical Treatment of Hypertension, In Press.
81. Rojas, F., Smithwick, R. H. and White, P. D.: Nonspecific Major Operations and Lumbodorsal Sympathectomy, J.A.M.A. 126:15-17 (Sept. 2) 1944.

Other authors(77-79) have reported satisfactory results using principally the Smithwick procedure.

The Grimson operation of near-total to total paravertebral sympathectomy, involving removal of the stellate ganglia, the thoracic chain, the celiac ganglia, and the first and second lumbar ganglia, represents the most extensive of all reported techniques. Satisfactory results have been obtained in 70 per cent of 77 cases thus far summarized, but complete follow-up studies of the entire group of cases are not yet available. The results in a small series of cases in which the extent of sympathetic denervation was decreased by a modified technique, comparable to that of Smithwick, have been far less satisfactory.

It is difficult to compare the results of operative procedures at present because of the varying standards used in the selection and classification of patients initially and the different criteria for postoperative results. The problem of selecting patients suitable for operation remains of paramount importance, and no definite rules as yet may be stated with confidence. Methods are not available which will determine with accuracy and assurance the benefits to be derived from surgery of the sympathetic system. It is agreed, however, that one should be hesitant about suggesting operation for the patient with hypertension who is over 50 years of age or who has significant disease of the three vital tissues affected most commonly by hypertension—namely, the heart, kidneys, and brain; for with more advanced disease of these structures the mortality rises and the probability of benefit becomes limited. While at this stage of our knowledge no final recommendation can be made with regard to the best type of procedure for all patients, we agree with Grimson that "the lowering of the blood pressure has been directly proportional to the extent of the sympathectomy and inversely proportional to the severity of the disease."

In spite of the infrequency with which unilateral disease of the kidney is the direct cause of hypertension, occasional reports(82) are still presented of good results obtained by unilateral nephrectomy in appropriate instances.

### *Surgical Treatment of Congenital Cardiac Defects*

During the past ten years surgery in general has provided many new approaches to the cure of disease. From the cardiovascular standpoint the results of techniques devised for the treatment of certain congenital defects have been spectacular indeed. The three congenital defects of the heart for which surgical correction is now available are patency of the ductus arteriosus, coarctation of the aorta, and the tetralogy of Fallot. To Gross(83), Blalock and Taussig(84), and Crafoord and Nylin(85), whose intelligence, skill, and courage pioneered these achievements, we must express our profound admiration as well as our gratitude.

#### *Patent ductus arteriosus*

The first congenital heart lesion for which cure by surgery was accomplished is that of patent ductus arteriosus. To Gross(83) must go the credit for the first successful ligation, accomplished in 1939. Since his initial paper was published, many other successful operations have been recorded. The importance of the condition lies in the fact that after the age of 17 the life span may be shortened by twenty-five years, and of 60 autopsied cases reported by Keys and Shapiro(86), 41.7 per cent died of bacterial endocarditis and 28.3 per cent of congestive heart failure. Shapiro(87) has reported recently the results of the surgical treatment of this condition in 643 patients by forty-six different surgeons. In 17 instances an error in diagnosis was made. Of the remaining 626 patients, 431 were treated by various types of ligation. Of these, 343

82. (a) Bath, M. M. and Russek, H. I.: Urologic Disease as a Cause of Hypertension, Am. Heart J. 29:516-525 (April) 1945; (b) Kittredge, W. E. and Brown, H. G.: The Present Status of Unilateral Renal Hypertension, J. Urol. 55:213-219 (March) 1946; (c) Ratliff, R. K., Nesbit, R. M., Plumb, R. T., and Bohne, W.: Nephrectomy for Hypertension with Unilateral Renal Disease: Report of Forty-Nine Cases, J.A.M.A. 133:296-299 (Feb. 1) 1947.

83. Gross, R. E. and Hubbard, J. P.: Surgical Ligation of a Patent Ductus Arteriosus: Report of First Successful Case, J.A.M.A. 112:729-731 (Feb. 25) 1939.

84. (a) Blalock, A. and Park, E. A.: The Surgical Treatment of Experimental Coarctation (Atresia) of the Aorta, Ann. Surg. 119:445-456 (March) 1944; (b) Blalock, A. and Taussig, H. B.: The Surgical Treatment of Malformations of the Heart in Which There is Pulmonary Stenosis or Pulmonary Atresia, J.A.M.A. 128:189-202 (May 19) 1945.

85. Crafoord, C. and Nylin, G.: Congenital Coarctation of the Aorta and Its Surgical Treatment, J. Thoracic Surg. 14:347-361 (Oct.) 1945.

86. (a) Shapiro, M. J. and Keys, A.: The Prognosis of Untreated Patent Ductus Arteriosus and the Results of Surgical Intervention: A Clinical Series of 50 Cases and An Analysis of 139 Operations, Am. J. M. Sc. 206:174-183 (Aug.) 1943; (b) Keys, A. and Shapiro, M. J.: Patency of the Ductus Arteriosus in Adults, Am. Heart J. 25:158-186 (Feb.) 1943.

87. Shapiro, M. J.: Recent Advances in Surgical Treatment of Patent Ductus Arteriosus, Mod. Concepts of Cardiovasc. Dis., Vol. 16, No. 1 (Jan.) 1947.

were uninfected, and the mortality rate was 4.9 per cent. In the remaining 88 patients, who had superimposed endarteritis, the mortality rate was 28.4 per cent. Recanalization occurred subsequently in 30, or 8.7 per cent, of the 343 patients with uninfected ducts, and in 4.5 per cent of the 88 patients with infected ducts. This report represents a distinct advance, in that the mortality has been reduced from its initial level of 8 per cent to the predicted mortality of 5 per cent with improvements in methods, experience, and skill. It is suggested that recanalization will develop in about 10 per cent of the cases following ligation.

Of the 626 patients who were submitted to operation, 195 had section of the duct. Of these, 182 were uninfected, and there was 1 death from hemorrhage in this group. Of 13 patients with complicating bacterial endarteritis, 2 died, although section was performed successfully in one of these cases. It is suggested that section should be done whenever possible; but if this is not feasible, ligation should be performed.

In view of the fact that cardiac efficiency is greatly impaired by the existence of a patent ductus arteriosus and that surgical cure can be effected with a minimal fatality rate in the hands of a skilled surgeon(88), it now seems wise to submit all patients with this condition for operation at a suitable time. This implies that all children should be operated upon, irrespective of physical or mental retardation or evidence of cardiac embarrassment. There is incomplete agreement regarding the treatment of the infected case(89). It has been demonstrated that bacterial endarteritis may be cured by ligation without chemotherapy. In view of the danger that the duct may be made more friable by inflammation, however, conservative therapy with the antibiotic drugs should be carried out first, operation being postponed to a later and more favorable date. Patients who fail to respond to chemotherapy still may be submitted to operation. The diagnosis of patent ductus arteriosus can be made with ease when the typical signs of a machinery murmur, increased pulse pressure, and a prominent pulmonary artery are present. It would seem unwise to operate on those patients in whom only a systolic murmur is audible over the pulmonary conus, even though an occasional one may have a patent ductus. Gross considers the optimal age for operation to lie between 3 and 16 years(90). His own cases have ranged in age from 11 months to 47 years.

*Coarctation of the aorta*

The second congenital condition for which surgical cure is available is that of coarctation of the aorta, a condition seen infrequently in young children and adults, and characterized by hypertension in the upper extremities and a lower systolic pressure in the lower extremities(91). The importance of the condition lies in its prognosis. The average age at death is approximately 35 years, and although the lesion may occasionally be compatible with long life, 60 per cent of the patients die before the forty-first year. Initial experiments revealed the feasibility of excising segments of the aorta and performing end-to-end anastomosis(92) without injury to the experimental animal. The first successful operations on 2 patients were performed in October, 1944, by Crafoord and Nylin(85).

Gross(93) has reported recently his experiences with 16 patients who have been operated upon for coarctation of the aorta. In 2 patients the strictured area could not be excised. In 11 patients the constricted area of the aorta was removed with anastomosis of the remaining ends, and in each instance hypertension in the upper extremities was completely relieved. There were fatalities in 2 additional patients, one from the premature release of the constrictor clamps, and the other presumably from rupture of the suture lines in a patient aged 30 who had marked sclerosis of the aorta, rendering it unsuitable for satisfactory suture. In another patient the area of anastomosis was unsatisfactory, and an adequate lumen could not be established.

Gross has suggested that the optimal age

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88. Gross, R. E.: Present Day Surgical Treatment of the Patent Ductus Arteriosus, Bull. New England M. Center 7:171-175 (Aug.) 1945.
89. Vesell, H. and Kross, I.: Patent Ductus Arteriosus with Subacute Bacterial Endarteritis: Diagnosis and Indications for Operation, Arch. Int. Med. 77:659-677 (June) 1946.
90. Gross, R. E.: Personal communication.
91. Reifenstein, G. H., Levine, S. A. and Gross, R. E.: Coarctation of the Aorta. A Review of 104 Autopsied Cases of the "Adult Type", 2 Years of Age or Older, Am. Heart J. 33:146-168 (Feb.) 1947.
92. Gross, R. E. and Hufnagel, C. A.: Coarctation of the Aorta: Experimental Studies Regarding Its Surgical Correction, New England J. Med. 233:287-293 (Sept. 6) 1945.
93. Gross, R. E.: (a) Surgical Correction for Coarctation of Aorta, Surgery 18:673-678 (Dec.) 1945; (b) Technical Considerations in Surgical Therapy for Coarctation of the Aorta, Surgery 20:1-8 (July) 1946; (c) Surgical Treatment for Coarctation of the Aorta, Mod. Concepts Cardiovasc. Dis., Vol. 16, No. 2 (Feb.) 1947.

for the operation lies between 6 and 20 years. Beyond the age of 20 to 25 years arteriosclerosis renders the aorta unsuitable for manipulation and suture, and it is predicted that the surgical mortality will probably be forbiddingly high. Younger patients have sufficient elasticity of the aorta to permit the operative procedure to be performed with a reasonably low surgical risk. In view of the poor prognosis of the disease ultimately, it seems acceptable that most, if not all, young patients in whom the diagnosis of coarctation of the aorta can be established satisfactorily should be submitted to surgery. Untreated patients succumb to bacterial endocarditis, rupture of the aorta, congestive heart failure, and cerebral hemorrhage(91).

*Pulmonary stenosis*

The third congenital cardiac lesion for which operation offers important amelioration, but not cure, is that of pulmonary stenosis or atresia with reduction in the pulmonary blood flow. To Blalock and Taussig(84b,94) must go the credit for the creation and clinical application of an artificial arterial ductus to improve pulmonary arterial blood flow. This operation generally consists in the end-to-end anastomosis of a subclavian artery or of the innominate artery to one of the branches of the pulmonary artery, the latter depending upon whether the aortic arch descends upon the right or the left. By means of this procedure the degree of oxygen saturation of the arterial blood may rise as much as 50 per cent during the several months following operation. In view of the common occurrence of a dextroposed aorta overriding an interventricular septal defect, arterial saturation would not be expected to reach a normal level, even though the operation is completely successful. The congenital abnormalities which may be benefited by this operation are the tetralogy of Fallot (pulmonary stenosis, dextroposition of the aorta, interventricular septal defect, and right ventricular hypertrophy), pulmonary atresia with or without dextroposition of the aorta and with or without defective development of the right ventricle, truncus arteriosus with bronchial arteries, and a single ventricle with a rudimentary outlet chamber in which the pulmonary artery is diminutive in size.

In his latest report Blalock(94d) states that he has now operated upon 243 patients who were thought to have the tetralogy of Fallot. The overall mortality rate, including deaths among those on whom an anastomosis could not be performed, those in whom the diagnosis was in error, and those who have died since leaving the hospital, was 21 per cent. The mortality rate in the second 100 patients was 15 per cent. In those patients (147) in whom an anastomosis between the end of a subclavian artery and the side of a pulmonary artery was performed, the mortality rate was 9 per cent. On the other hand, the mortality rate among those in whom the carotid or innominate artery was used (57) was 33 per cent. It seems pertinent to state that the operative mortality may have been influenced by the necessity for early operation in those patients who were in the poorest condition. As Blalock pointed out, 20 or more patients died while awaiting admission to the hospital for operation. While the patients have ranged in age from 4 months to 26 years, the preferable age for operation is given as 3 to 10 years.

Insufficient time has yet elapsed to allow a final evaluation of the late effects of an artificial patent ductus. The heart has consistently enlarged in the several months following operation, but the size apparently has remained unchanged after one year. Blalock has stated that cardiac enlargement after the first several weeks is not progressive, and that thus far streptococcus viridans infections have not developed. As a result of surgical technique and skill, no instances of empyema or mediastinitis have been encountered.

An additional report has been made by Potts(95) and others of 3 instances in which the pulmonary artery was anastomosed to the aorta. In 2 patients the results were striking; one fatality was encountered. According to Blalock the preferable operation at the present moment would seem to be the

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94. Blalock, A.: (a) Physiopathology and Surgical Treatment of Congenital Cardiovascular Defects. Bull. New York Acad. Med. 22:57-80 (Feb.) 1946; (b) Effects of an Artificial Ductus Arteriosus on Experimental Cyanosis and Anoxemia. Arch. Surg. 52:247-252 (March) 1946; (c) The Surgical Treatment of Congenital Pulmonic Stenosis. Ann. Surg. 124:879-887 (Nov.) 1946; (d) The Use of Shunt or By-Pass Operations in the Treatment of Certain Circulatory Disorders, Including Portal Hypertension and Pulmonic Stenosis, Ann. Surg. 125:129-141 (Feb.) 1947.

95. Potts, W. J., Smith, S. and Gibson, S.: Anastomosis of the Aorta to a Pulmonary Artery. Certain Types in Congenital Heart Disease, J.A.M.A. 132:627-631 (Nov. 16) 1946.

anastomosis of the subclavian artery, provided it is large enough, to a branch of the pulmonary artery. The right subclavian is preferred to the left, in view of the angulation of the left subclavian artery as it arises from the aorta and its possible kinking after anastomosis with the left pulmonary arterial branch.

Unquestionably this operative procedure offers temporary amelioration and is a lifesaving surgical procedure for those young patients with cyanosis due to congenital heart disease of specific types. It is agreed that the operation is not justified in those patients exhibiting adequate pulmonary blood flow—for example, patients with the tetralogy of Eisenmenger. We await with interest the late effects of the creation of an artificial arteriovenous fistula. In spite of the obvious temporary improvement it is to be expected that, as in a congenital patent ductus arteriosus, the effects of left ventricular strain due to an increased cardiac output may become manifest over a period of years long after the creation of an artificial ductus.

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# APOPLEXY OF THE ABDOMINAL WALL

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It is not within the scope of this paper to deal with abdominal hemorrhage in general. This discussion will confine itself to hemorrhage of the anterior abdominal wall, occurring in the rectus sheath.

Spontaneous hemorrhage into the rectus abdominis muscle is rather rare, but it has been reported some three hundred times. It is likely that many times that number of cases have been recognized but not reported, and that many small hemorrhages have gone unrecognized. Rupture of the muscle fibers, with rupture of the superior or inferior deep epigastric vessels, may involve any portion of the rectus; the weakest part of the muscle —that below the semilunar fold of Douglas, where there is no posterior rectus sheath— is most liable to this accident. The absence of this sheath at the lower third of the muscle contributes to the muscle weakness. Since the peritoneum is in direct contact with the muscle in this area, a collection of 50 to 2,000 cc. of blood will exert pressure against the peritoneum in proportion to the size of the hemorrhage.

## *Etiology*

The cause of rupture in many cases can not be determined. The following etiologic classification suggested by Hilgenreiner⁽¹⁾ appears most satisfactory:

1. Traumatic—occurring chiefly in young, robust men of sound physical condition
    a. Direct violence
    b. Indirect violence.
2. Spontaneous—occurring in muscles weakened or atrophic from local or systemic disease
    a. Infections—for example, typhoid or influenza
    b. Pregnancy, labor, or puerperium
    c. Arteriosclerosis or associated disease.

It is generally agreed that rupture follows some muscular effort, although in some cases the effort has been so slight or so usual as to have left no impression on the patient's mind. A large percentage of cases follow severe exertion, such as that of athletic contests, heavy lifting, or sudden muscular effort. A number of cases occurred in soldiers while they were being put through their paces, especially when scaling a wall. Rupture may follow a cough or sneeze.

The most common symptom is pain over the site of the hemorrhage. The pain is in proportion to the extent of damage to the muscle and the size of the hematoma. Since extraperitoneal bleeding causes essentially the same peritoneal irritation as does intraperitoneal bleeding, nausea and vomiting are not uncommon symptoms. The patient is usually apprehensive, and there is often a picture of shock and its attending phenomena, depending on the degree of rupture and hemorrhage.

Tenderness and rigidity over the site of injury may be extreme. An indefinite mass is often seen and felt, and the area adjacent to the mass has a tenderness or rigidity. This important diagnostic sign, together with the fact that the mass is always located over the rectus muscle, helps to exclude intra-abdominal conditions. A hemorrhage may be so large as to force the peritoneum down in the pelvis, so that the mass can be palpated on rectal or vaginal examination.

The diagnosis is difficult, and many, if not most, of these patients have been subjected

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(1) Hilgenreiner, H.: Spontaneous Hematoma in Abdominal Wall in the Elderly. Beitr. z. klin Chir. 129:700-710, 1923.

to abdominal operation, with a mistaken diagnosis of some acute intra-abdominal condition such as acute appendicitis, twisted ovarian cyst, ruptured ectopic pregnancy, incarcerated hernia, volvulus, intussusception, mesenteric thrombosis, perforated peptic ulcer, or gallbladder disease.

As in other diagnostic problems, the history is of utmost importance. A history of sudden pain closely related to muscular effort, or of direct trauma to the abdomen and the appearance of a mass over the rectus muscle should strongly suggest the diagnosis In patients with infectious fevers and advanced systemic diseases, the history of a severe coughing spell preceding the sudden onset of abdominal pain and the appearance of a mass should make one suspect that the mass is intramural, rather than intraperitoneal.

The cases in which no mass develops are more difficult of diagnosis. It is well to remember that the pathologic changes are confined to the rectus sheath, and that the tender mass will not extend beyond its limits. Exceptions to this rule are the cases in which the hematoma points intra-abdominally; even in these cases, however, there is no relation to the pelvic organs, and the history should indicate the correct diagnosis. It is worth remembering that the symptoms are usually not intense and that they may be days in developing.

Surgery is not always necessary in these cases. If a large mass or hematoma develops, however, it should be evacuated, the vessels ligated, and the ruptured muscle sutured. Unless the diagnosis is reasonably well established, any patient with acute symptoms should have the benefit of operation. There is danger of overlooking some acute intra-abdominal condition in which immediate operation is necessary to save the patient's life.

## *Case Reports*

### *Case 1*[2]

A colored man, 18 years of age, was admitted to the Good Samaritan Hospital in 1927 with a history suggestive of appendicitis. A tender mass was present over his right rectus. At operation a hematoma and ruptured rectus muscle fibers were found. A normal appendix was removed. Following the operation, the patient gave a history of having been in a fight the day before and being hit in the lower abdomen.

### *Case 2*

A 63-year-old spinster, a patient of Dr. L. B. Newell, was admitted to Mercy Hospital on September 16, 1944, complaining of pain low in the right side of the abdomen. Three days before, while lifting a heavy washtub, she felt acute pain in the lower right quadrant of the abdomen. She was able to continue her work, but the pain never entirely cleared up. Twenty-four hours before admission she felt another acute stabbing pain in the same area. She became nauseated, but did not vomit. At the time of admission she had eaten very little since the first attack. She complained of dizziness.

Her past history was entirely negative, and she had been generally in good health.

On examination the patient appeared somewhat anemic and underweight, and was somewhat apprehensive and nervous. There was no abnormality about the head and neck, and the heart and lungs showed no evidence of disease. The abdomen was slightly distended and there was a suggestion of a mass, or rather a fullness, over the lower part of the right rectus. Moderate tenderness and rigidity were noted over this mass and over the lower right side generally, and there was slight tenderness on the left (referred). No tenderness was elicited in the lower abdomen. The vaginal examination was negative. The blood pressure was 130 systolic, 75 diastolic; the temperature was 99.6 F., the pulse 95, respiration 22.

There were 3,200,000 red blood cells, a hemoglobin of 65 per cent, and 14,000 white cells, with 78 per cent polymorphonuclears, 20 per cent lymphocytes, and 2 per cent mononuclears. The urinalysis was essentially negative.

The preoperative diagnosis was acute appendicitis. Under general ether anesthesia a right pararectus incision was made. On opening the anterior sheath of the rectus, which was discolored, dark blood clots and free, bright blood were seen, with extensive transverse rupture and separation of the rectus muscle. The ends were fragmented and friable. There was also an irregular rupture of the peritoneum large enough to admit the exploring hand. The pelvis was full of blood clots. After removing the blood and clots, further exploration revealed, much to my surprise, an acutely inflamed appendix. It was removed.

When the injury had been repaired and closure of the incision was started, I found that, in addition to the longitudinal incision in the skin, there were two radiating, transverse separations in the skin at the lower angle of the incision, one extending inward one and one-half inches, the other, opposite, extending outward the distance of one inch. Since I had not intentionally made these arms to the incision, they were evidently tears which occurred as a result of exploring and removing the blood clots. I found further, on taking hold of the skin, that with only a slight pull it would tear as readily as wet blotting paper. The tear was like a clean cut, however, rather than ragged, as would be a tear in a wet blotter. Bits of skin and muscle were removed for section.

The pathologic report by Dr. W. M. Summerville was as follows:

"Specimen 1 consists of a small piece of skin, a piece of muscle, and a large blood clot. Sections show fibrous, fatty and muscle tissue with considerable hemorrhage. Sections through the skin show no unusual findings.

"Specimen 2 consists of an appendix measuring 5.2 x 0.7 cm. with a thickened, deeply injected wall. This appendix shows a diffuse leukocytosis and an exudate in the lumen. Diagnosis: Acute diffuse appendicitis."

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[2] This report is made entirely from memory, as I have been unable to find the patient's record in the hospital's files or my own.

The patient reacted well, had an uneventful convalescence, and was about ready to be dismissed from the hospital. While up in a chair on the thirteenth day she began to complain of acute pain in both sides of her chest, with dyspnea. She was cyanosed and had rales at both lung bases. She gradually went into shock, which grew worse in spite of supportive treatment. She died the next day.

An autopsy was performed by Dr. Summerville and his report is as follows:

"The body of an emaciated, elderly woman showing an abdominal incision closed by sutures.

"**Chest:** No fluid was present. There were loose adhesions over the lower lobes of both lungs.

"Lungs: The left lung showed a hemorrhagic infarct involving the greater portion of the lower lobe. The remainder of the lobe and the upper lobe were grossly negative. The right lung showed two small hemorrhagic infarcts in the lower lobe. The upper and middle lobes appeared grossly negative.

"Heart: The heart was normal in size. The myocardium, endocardium, and valves were essentially negative.

"**Abdomen:** There was marked extravasation of blood into the tissue surrounding the surgical incision and there was clotted blood beneath the rectus sheath, posteriorly, and from the ribs to the pelvis. There was a small amount of serosanguineous fluid in the abdominal cavity. No abdominal viscus showed gross pathology of any ordinary sort.

"**Note:** All of the tissues of the body were very soft and friable. Moderate pressure on any of the viscera would result in rupture. The large blood vessels, on slight tension, pulled in two. On lifting the heart, to cut the large vessels, the aortic and pulmonary arteries ruptured, and the fingers of the lifting hand penetrated the myocardium to the cavity.

"**Microscopic findings:** Sections from the lungs showed large areas in which the alveoli were filled with red blood cells and the interalveolar vessels were markedly engorged. The heart muscle showed a loss of cross striation. The liver showed considerable engorgement and moderate parenchymatous degeneration. The kidneys showed some thickening of the medium-size arteries and some glomerular fibrosis. Sections from the rectus muscle showed hemorrhage with areas of organization. The pancreas and adrenals showed no significant changes."

### *Summary*

The first case is illustrative of hemorrhage into the rectus from direct violence—a blow over the lower abdomen. The second case exemplifies two different etiologic factors. The patient's age (63) and some degree of emaciation possibly weakened the muscle fibers. The other factor, the immediate cause, was the strain of lifting a tub.

The suggestion of tumor was perhaps nothing more than edema, and the absence of a definite tumor can be explained by the rupture of the friable peritoneum, which dumped the blood into the abdominal cavity. Incidentally, this is the only case reported in which the peritoneum ruptured.

The absence of the classical diagnostic symptoms in this case—tenderness and rigidity limited to the area of the injury—is due to the fact that the rupture of the peritoneum discharged the blood into the peritoneal cavity, and to the co-existing appendicitis, which caused a more diffuse tenderness and rigidity.

### *Conclusion*

1. Rupture of the rectus muscle, with hemorrhage into the rectus sheath, is of interest as a clinical entity, and of importance because of the similarity of its symptoms to those of acute intra-abdominal, surgical conditions which demand immediate operation.

2. Case 2 is an unusual instance of coexistence of two acute surgical conditions, apparently not related in any way, unless the appendicitis could have resulted from trauma.

3. The friability of tissues which was demonstrated in the skin, the blood vessels, and the viscera of the second patient, as well as in the ruptured muscle and ruptured peritoneum, is of peculiar interest. I have been unable to find any reference whatsoever to such extensive friability of tissue in living patients.

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## PRE-ECLAMPTIC TOXEMIA OF PREGNANCY

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Titus(1) defines pre-eclamptic toxemia as a "profound disturbance in maternal metabolism, aggravated by the presence of a parasitic organism, the fetus." This definition is not entirely accurate, however, for eclampsia may occur days after delivery of the fetus and placenta, in patients who have shown no evidence of antenatal toxemia; it may also occur in patients with hydatidiform mole. In the constant search for the cause of toxemia these facts are significant; they would seem to indicate that "the causative agent must be confined to the maternal organism, although undoubtedly activated or conditioned by the product of conception."(2)

Most authors now believe—and much evi-

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2. Stander, H. J., Bonsnes, R. W., and Stromme, W. B.: Late Postpartum Eclampsia, Am. J. Obst. & Gynec. 52: 765-772 (Nov.) 1946.

dence has been presented to support the belief—that toxemia of pregnancy is an affection of the vascular system and that vasospasm of the small terminal arterioles plays an all-important role in the pathogenesis of the disease(3). It is only by accepting this theory that we can explain the return to normal kidney function in many pre-eclamptic and eclamptic patients twenty-four hours *post partum*. This occurrence precludes an organic lesion and presupposes a functional one(4). Angiospasm, decreasing or even stopping the blood flow through the glomeruli, would explain many of the findings in toxemia and would, if continued too long, result in permanent kidney damage and impaired function. All of the agents used in treating toxemia—morphine, magnesium sulfate, barbiturates, veratrum viride, and caudal or spinal anesthesia—are directed toward relief of vasospasm. The trigger factor setting off this mechanism of vasospasm remains a mystery. In spite of this important missing link, much progress, from a clinical standpoint, has been manifested in the past few years in regard to our knowledge of toxemia.

Many reliable investigators have demonstrated that, under ideal conditions, toxemia of pregnancy can be almost entirely prevented. Progress made against toxemia in controlled series is comparable with the results obtained in the prevention of puerperal infection since the advent of the sulfonamides(5). Although the specific etiologic factor of toxemia still eludes us, we cannot ignore the results which have been accomplished by proper preventive treatment.

### *Prevention*

#### *Principles of prophylaxis*

The prevention of toxemia should begin as early as possible in pregnancy, with prophylactic measures designed (1) to prevent an excessive weight gain, (2) to assure a more than adequate protein diet, and (3) to prevent the retention of sodium and water(6). Under such a regimen severe pre-eclampsia seldom develops, and, if it is adequately treated, rarely results in eclampsia.

Luikart(5) recently reported that in a series of 1,000 normal, pregnant women who cooperated on a regimen of rigid weight contol with adequate nutrition, no true toxemia developed, no patient's blood pressure exceeded 145 systolic, 85 diastolic, and edema was negligible. When edema occurred, it disappeared in four to ten days on a salt-poor diet with an increase in the protein intake. He assumes that every pregnant woman is at least a potential candidate for toxemia of pregnancy — an assumption which seems logical. The objective of Dr. Luikart's program was to restrict the total weight increase to 16 pounds or less, or a maximum of 2 pounds in any one month of pregnancy. There were no large babies in his series, but the average weights were only slightly less than 7 pounds. His diets were high in protein.

Williams(7) states that the incidence of toxemia in pregnancy was twice as great in a group of pregnant women whose protein intake was 60 to 70 Gm. daily as in a similar group whose protein intake ranged from 110 to 120 Gm. daily. Leverton and McMillan(8) found that women who received, in addition to their self-chosen diets, a 5-ounce serving of meat daily from the fifth month of pregnancy to the third month after delivery, had higher hemoglobins and red cell counts, less edema, and better lactation. Dieckmann(9) believes that anemia predisposes to edema and toxemia. Collins(3e) and many others are convinced that the liver plays a large part in toxemia, and that it is essential to protect the liver function by supplying sufficient amounts of the vitamin B complex. A diet high in protein assures an adequate intake of vitamin B. It has been found that the incidence of late toxemia is increased in patients who had severe nausea and vomiting during the first trimester(10). In view of the evidence showing the necessity for a high

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3. (a) Harkins, J. E.: Veratrum Viride in the Treatment of Pre-Eclampsia, Eclampsia, and Other Hypertensive Syndromes of Pregnancy: A Preliminary Report, Texas State J. Med. 41:143-151 (July) 1945; (b) Aikawa, J. K.: Pathogenesis of the Toxemias of Late Pregnancy, North Carolina M. J. 7:46-59 (Feb.) 1946; (c) Goldblatt, H.: Studies on Experimental Hypertension: Pathogenesis of Experimental Hypertension Due to Renal Ischemia, Ann. Int. Med. 11:69-103 (July) 1937; (d) Dill, L. V. and Erickson, C. C.: Eclampsia-Like Syndrome Occurring in Pregnant Dogs and Rabbits Following Renal Artery Constriction, Proc. Soc. Exper. Biol. & Med. 39:362-365 (Nov.) 1938; (e) Collins, C. G.: Personal communication, April 3, 1947.
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intake of protein and vitamins, it might seem logical to assume that the late toxemia is a result of dietary inadequacies produced by the prolonged nausea and vomiting.

It has been observed that weight gain between the twenty-fourth and thirty-eighth weeks of pregnancy is 50 per cent greater in toxemic patients than in normal pregnant women, and that during the last two weeks of pregnancy it is almost three times as great(11). Much of the sudden weight gain is due to edematous fluid, but the factors of overeating, underexercising, and actual weight gain from additional body tissues are of great importance as predisposing causes of toxemia(1). Rossenbeck(12) found that the sodium content of muscle is slightly increased in normal pregnancy and is enormously increased in eclampsia. He also found that calcium absorption was higher with a high-protein diet than with a low protein intake.

The high incidence of toxemia of pregnancy in charity hospitals and wards as compared with the low incidence among private patients shows the direction in which most effort should be exerted. Investigation into the diet of these clinic patients, in the light of what we now know, reveals the obvious reasons for the high incidence of toxemia among them. Too often, the meat intake of such patients consists solely of salt pork, which is usually fried. They eat few eggs, because they don't like them. Cornbread, biscuit, grits, rice, corn, potatoes, beans, turnips, molasses, and fruits canned in sugar make up the bulk of their diets. Such a diet, low in protein and high in starches, fats and salt, is conducive to excessive weight gain, anemia, vitamin deficiencies, and fluid retention—all factors predisposing to toxemia. More and more patients in the low-income and indigent groups are being reached by prenatal care through local, state, and federal clinics, but too often the economic status of these people prohibits their complying with dietary advice. In such patients we shall continue to have toxemia of pregnancy.

### *Antepartum care and education of the patient*

Routine antepartum care has done so much to reduce the morbidity and mortality of toxemia that its importance cannot be too strongly emphasized. This is the only way by which early symptoms may be detected. Too often, however, antepartum care does not do all that it should. It should be more than just a vigilant watch; it should be an active period of education for the patient. She must be convinced of the importance of instructions and of the potential hazards if they are not followed. Success in weight control depends largely on the first seven months, and if the patient lets her appetite get out of bounds during that time, toxemia is sure to follow in a certain proportion of cases(13). Obviously wholehearted cooperation of the patient is essential. This cooperation will only be obtained by spending time at each prenatal visit in explanations, instructions, and advice. Make her understand what you are trying to do, and why and how. Make her diet- and weight-conscious, and give her the reasons for doing so. She must be impressed with the fact that her own safety and welfare, and that of her baby depend chiefly on her cooperation.

Old fallacies must be dispelled and erroneous impressions corrected. Assure the patient that she does not have to eat for two, and that women who have lost weight throughout gestation have had normal-sized, healthy babies. Explain that cravings for foods during pregnancy are not a demand for nourishment on the part of the baby; clear up the "for every child a tooth" adage, and impress on her that the calcium in her teeth is fixed and cannot be drawn away by her unborn child, and that excessive calories in the form of milk and fruit juices are therefore unnecessary. Luikart(5) cites the case of a woman who gained 110 pounds during pregnancy! It was found that she had bad teeth, but had avoided a dentist, believing that his work would bring on miscarriage. In the last four months of her pregnancy three quarts of milk and the juice of six oranges daily had been prescribed to prevent further damage to her teeth.

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*Dietary instructions*

Apparently simple dietary instructions are much better heeded by the average patient than the usual routine, unattractive, printed forms and lists. The mother should be told that the baby obtains its growth principally from proteins, minerals and vitamins, and that her protein intake must exceed that taken prior to pregnancy. Meat, in the form of beef, lamb or fish, should be eaten at least once daily. One or two eggs should be eaten daily, and liver once or twice weekly. These foods may be prepared in any manner except fried. Each day the patient should have two servings of cooked, green vegetables. Let her know that green vegetables contain valuable vitamins, and readily assimilable proteins and minerals. Skimmed milk, which contains more calcium than whole milk, may be allowed with meals when weight gain is not excessive. These items form the bulk of her diet, and starches, sweets and fats in limited amounts may be added to balance the meals. Intake must be reduced at the expense of the latter, when there is evidence of excessive weight gain.

When starches must be reduced, the doctor should explain that he means bread, potatoes, grits, spaghetti, macaroni, corn, pastries, and sweets. The patient should be told that the morning "coke" contains 75 calories, and that the excessive eating of fruit is unnecessary; the average apple contains 85 calories and the average banana 125 calories. She must be trained to obey the scale rather than the appetite, and to leave the table hungry when she is gaining excessively. Practically any food that relieves hunger has caloric value. Obviously each patient must be strictly individualized and helped with her own particular diet, as differences in digestion, assimilation, and utilization will produce different results in patients on the same intake(5).

From the beginning of pregnancy the intake of salt should be decreased. The patient may use salt for cooking if her weight is under control, but she should stop sprinkling on extra salt at the table from the start. We know now that most edema is best controlled and even prevented by limiting the intake of sodium chloride(14). Pretzels, cheese, sausage, salted meats, mustard, and catsup are among the foods to be avoided because of their salt content. If the patient absolutely rebels against saltless foods, salt substitutes which are free of the sodium radical may be used. The patient must be taught that this same sodium radical is present in sodium bicarbonate and in most of the patent medicines used for the relief of gastric distress.

Calcium and vitamin D should be supplied daily when the milk intake is not ample, and iron may be added if necessary. Luikart(5) gave thyroid extract to those patients in his series who could tolerate it, and suggested that 5 mg. of benzedrine sulfate three times daily may be helpful in curbing an uncontrollable appetite. Needless to say, good general hygiene, regular elimination, suitable exercise, avoidance of chilling, and ample rest are essential fundamentals of each antenatal program.

### *Treatment*

The early symptoms of toxemia are malaise, dullness or drowsiness, headache, slight swelling of the face and extremities, and a decrease in the amount of urine voided. Characteristically, the patient seems to have a mental sluggishness or indifference which often causes her to neglect to report symptoms about which she has been carefully forewarned. Visual disturbances, vertigo, and epigastric pains are more advanced symptoms. The physician should not wait for albuminuria to appear, but should act at the first sign of a rise in blood pressure, or a sudden weight gain. Place the patient at bed rest, further increase her protein intake, and eliminate salt. A mild sedative such as phenobarbital should be given, elimination should be increased by magnesium sulfate, and intravenous injections of hypertonic glucose are valuable, especially in the presence of edema.

The active treatment of pre-eclampsia is essentially the preventive treatment of eclampsia(1). If begun early enough, careful medical management of the toxemic patient will usually prevent further increase in the severity of symptoms and signs until labor supervenes, or until the cervix is "ripe." If, however, the toxemia is progressive, despite treatment, or even if it fails to show prompt improvement, interruption of pregnancy must be considered. The condition of the

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cervix should determine the method employed. Induction of labor, especially in the primigravida, should be medical rather than instrumental, because it may be advisable to resort to cesarean section if repeated attempts at induction fail. Cesarean section may be a much more conservative procedure than an unsuccessful instrumental induction, which may produce infection and which often causes many hours of ineffectual pains. Labor and delivery may sometimes be the final strain necessary to produce convulsions in a pre-eclamptic patient.

Should eclampsia develop, the essential principles of treatment are the control of convulsions by proper sedation, and the production of diuresis. All measures are directed primarily at relief of vasospasm. Morphine and intravenous magnesium sulfate should be used to provide complete muscular rest and relaxation. Prolonged sedation may be secured by the hypodermic administration of such drugs as sodium phenobarbital. Intravenous magnesium sulfate should be repeated as long as there is evidence of cerebral irritation. Intravenous hypertonic glucose is valuable, but only in the smallest amounts necessary to restore a satisfactory urinary output, thereby helping to avoid cardiac embarrassment and pulmonary edema. Intranasal oxygen given continuously is invaluable. If oliguria is persistent or if anuria develops, or vascular collapse occurs, a blood transfusion is indicated. During the seizures the patient must be protected from injury to herself by the use of a tongue guard, removal of false teeth, and so forth. Should labor occur during eclampsia, rapid delivery should be effected as soon as the cervix is dilated.

Attempts to terminate pregnancy immediately after the convulsions have ceased are ill advised and dangerous. Therapy of the post-convulsive state consists in constant observation, nasal oxygen, study of the urinary output, and continued sedation. When the patient is able to swallow, she should be given magnesium sulfate orally and nourishment in the form of sweetened fruit juices frequently. Later, skimmed milk and more protein are given. As soon as possible, a thorough obstetric examination should be made. When the eclampsia is controlled and the patient's condition stabilized, or if relapses which are not readily controlled occur, the pregnancy should be terminated. No fixed rules for the method of termination can be made, and the choice must depend on conditions present, with particular regard to the cervix, and on the judgment of the operator.

### *Conclusions*

While its incidence is steadily decreasing, toxemia of pregnancy is still one of the most frequent causes of maternal deaths in this country. It is difficult to reconcile this fact with the knowledge that toxemia of pregnancy is largely preventable. At present our most potent weapon against toxemia, and one of which we should take full advantage, seems to be prophylaxis. This consists of complete prenatal care, with particular regard to obtaining the patient's full cooperation in (1) restricting the total weight gain, (2) obtaining a diet high in protein and vitamins, and (3) restricting the sodium intake.

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# CAUSALGIA

## *Its Etiology, Diagnosis and Treatment with Tetra-Ethyl-Ammonium Chloride (Etamon Chloride)*

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*and*
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Causalgia is a painful, posttraumatic state occurring in an extremity. It is a single, but very prominent, component of a pathologic condition best known, perhaps, as reflex sympathetic dystrophy. The term causalgia means "burning pain," and a deep, diffuse, burning pain with paroxysmal exacerbations is the cardinal symptom of this state. Causalgia has, as a rule, two other singular characteristics: (1) the distribution of the pain is rarely segmental, and (2) the trauma which incites it is generally negligible.

This condition was first described more than one hundred years ago, but apparently its typical pattern has not often been recognized clearly. Among the numerous synonyms for this condition which appear in

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The Etamon Chloride used in the cases reported in this paper was furnished through the courtesy of Parke-Davis & Company, Detroit.

medical literature are causalgia(1), posttraumatic painful osteoporosis(2), peripheral trophoneurosis(3), chronic traumatic edema(4), Sudeck's atrophy(4), traumatic vasospasm(5), traumatic angiospasm(6), and reflex sympathetic dystrophy(7). There are other names for this condition, particularly in the Continental literature. In the more recent American medical literature it customarily has been referred to as reflex sympathetic dystrophy or causalgia.

### *Symptoms and Signs*

There is only one symptom of causalgia: a burning pain with paroxysmal exacerbations. With very few exceptions, a striking disparity exists between the severity of the pain and the minor nature of the trauma causing it.

The signs by which this state manifests itself, however, are several. Although they may not be particularly evident at first, they can be found if searched for. These signs may be divided roughly into two stages, depending upon the duration of the process. These two stages are described below; we would like to point out, however, that causalgia is occasionally a rapidly self-limiting state and that following adequate immobilization of the injured part and the institution of physiotherapeutic measures many cases of suspected causalgia will subside. When the usual therapy does not result in prompt recovery, however, serious consideration should be given to the possible existence of a "major causalgia."

The signs in the first stage of causalgia persist, generally, for six to eight weeks. During this period the extremity is warm and dry; the muscles supplying the part are spastic; and moderate edema is usually present, particularly about the joint spaces. Hyperalgesia, confined to the area of injury, is almost invariable(6,8).

The second stage of this disease usually begins with the spread of the previously periarticular edema to surrounding soft parts. The affected limb slowly becomes cold to the touch; it feels hard, and a mottled cyanosis appears. The joints become stiff, and early muscle atrophy is generally discernible at this point. The former dryness of the skin is replaced by a hyperhidrosis. Throughout all of this time the distressing symptom of this disease is persistent, and the hyperalgesia is now diffuse. If serial roentgenograms have been taken, a characteristic, mottled osteoporosis, originally described by Sudeck, may be demonstrated early in the second stage(9). In time, the patient's apparently inconsequential primary trauma, under standard treatment, results in such manifest uselessness of the extremity and such extreme pain that amputation of the part is not infrequent. Amputation, while removing the signs, leaves the symptom, in the form of a "phantom limb," so frequently that such surgery is rarely advisable.

The differential diagnosis of causalgia entails only two major considerations(10)—hysteria and "compensation neurosis." There are several reasons that causalgia is often confused with hysteria: first, the pain and hyperalgesia follow no particular segmental area, as a rule; second, the discomfort is almost always far out of proportion to the degree of the injury causing it; and third, these patients display a rather extreme emotional lability in many instances.

For the same reasons, the physician is often sceptical of this peculiar pain state when compensation is involved in the case. Before a patient is labeled with the diagnosis of "compensation neurosis," however, causalgia should always be considered, and the patient should be given the benefit of therapy directed toward this condition. It must be remembered that the appearance of causalgia in medical literature was considerably antecedent to modern compensation leg-

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islation(1,11). As early as 1813 Alexander Denmark, in describing a soldier with a soft tissue injury of the arm, noted the cardinal symptom of causalgia: "I always found him with the forearm bent in a supine position supported by the firm grasp of the other hand. The pain was of a burning nature and so violent as to cause continual perspiration from his face."

### *Mechanism and Etiology*

Upon considering the signs of causalgia described above, the physician will see that in this state there is an abnormal activity of the anterior horn cells within the gray matter of the spinal cord; this activity is manifested by muscle spasm(8). The edema, cyanosis, hyperhidrosis, and excessive warmth or cold of the skin attest to an abnormal response of the sympathetic motor cells located in the gray matter of the lateral horn of the cord(8,9a,12). How these abnormal responses of the motor and sympathetic systems occur and why they persist are most clearly explained by Lorente de No(13). A diagram of the pathologic reflexes which account for the state of causalgia is shown in figure 1, which is briefly interpreted below:

The initial injury, involving sensory nerve filaments, becomes, for some reason, a source of chronic irritation(8). These sensory nerves, on entering the gray matter of the cord, make a synapse with "second-order" neurons which send their axons upward to the thalamus, where a synapse with a "third-order" neuron is made; these latter neurons send their axons to the sensory cortex. Constant afferent impulses from the injured area, a "trigger point,"(8) set up an abnormal state of activity in the second-order neurons in the gray matter of the spinal cord, and these second-order neurons in turn complete the reflex by stimulating the anterior horn cells and the sympathetic motor cells in the lateral horn; in addition, these second-order neurons transmit the sensation of pain upward. The ensuing muscle spasm and vasomotor changes which this disturbance in the cord has produced now furnish new sources of pain and, thus, new reflexes. A vicious circle is created.

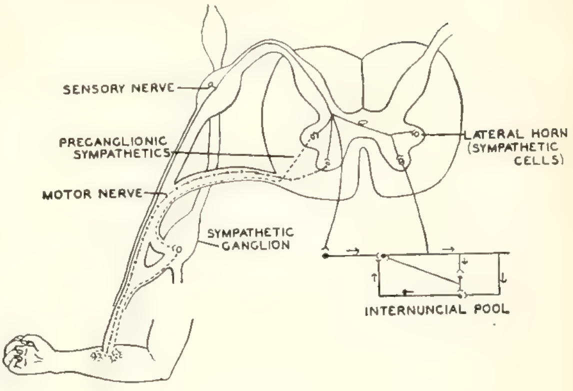

Fig. 1

If the "trigger point" is removed early, the pain may subside(8). If the process is allowed to continue, however, the constantly incoming sensory impulses will spread over larger and larger areas of second-order sensory neurons(14) in the gray matter upward, downward, and even occasionally across the cord. The sensation of pain then becomes diffuse, and in this stage the removal of the original source of irritation may not be enough to relieve the discomfort. If the condition continues to remain untreated, this ever-widening "pool" of abnormal activity in the cord may eventually involve the thalamus and the neurons representing its sensory radiation; when this stage is reached, the sensation of pain is said to be indelibly "imprinted" on the sensory cortex, the pain becoming a habit, as it were. Like a habit the pain may persist independently long after the original cause for its development is removed.

Figure 2 illustrates graphically the fact that the sensory nervous system is susceptible to painful stimuli at each of the three different levels(15)—a point which de Takats(16) recently emphasized. With this fact in mind, certain states remarkably resembling causalgia but resulting from no peripheral trauma can be clarified. Examples of such states are the reflex hyperirritability of acute anterior poliomyelitis (a "second neuron" lesion) and the painful posthemiplegic states occasionally seen (a "third neuron" lesion). Thus causalgia may be seen to follow central

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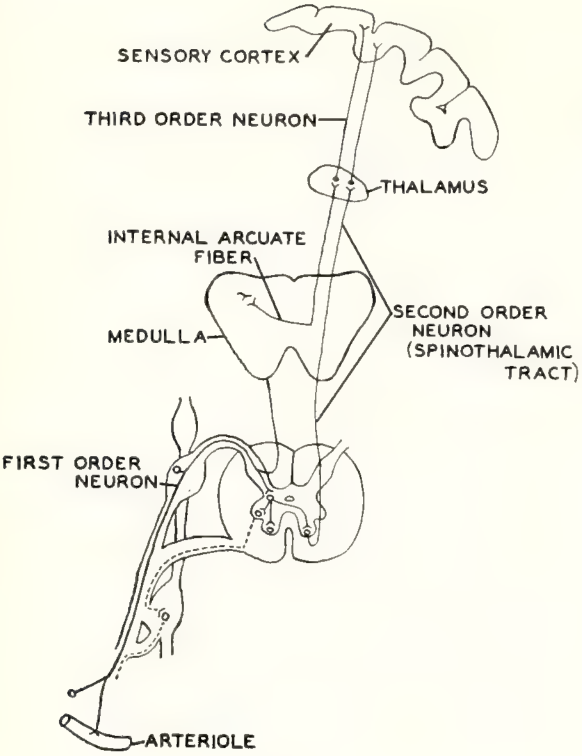

Fig. 2

as well as peripheral lesions; but yet more remarkable is the variety of apparently unrelated injuries which can produce causalgia. Indeed, we are of the opinion that the syndrome of causalgia may be inherent in most of man's acute afflictions; the scope of this paper, however, is limited to those causalgic states which occur in extremities following a local trauma.

Only a few of the various etiologic agents which have been reported as the sources of causalgic states are mentioned below to indicate the wide range of responsible causes. A paper by Evans(17) on this subject lists many more. Although it generally follows minor injury, such as sprain, causalgia has been described as a sequel of thrombophlebitis, plantar warts, subdeltoid bursitis, cerebral hemorrhage ("thalamic syndrome"), bismuth injections, and operative procedures. The operative procedure most often responsible for this state is an amputation, following which causalgia, when it appears, presents itself as a "phantom limb." During wartime, causalgia is frequently attributable to injuries of and around nerves(1,2,16).

### *Treatment*

Precisely how interruption of impulses in the sympathetic nervous system acts to ameliorate the pain of causalgia is by no means certain. Rather good evidence exists to show that afferent pain impulses are transmitted only by way of the posterior root, and that the sympathetic fibers entering the cord by way of the paravertebral ganglia are not responsible for the central conduction of pain impulses. Most physicians, at least, consider the sympathetic nervous system as purely an efferent one. Some observers, however, maintain that sympathetic afferent fibers are supplied to the peripheral blood vessels(2) and that these are the ones responsible for the painful syndrome under consideration(10b). The fact that the pain and hyperesthesia of causalgia are more suggestive of visceral than of somatic pain is some evidence of the presence of afferent sympathetic fibers. Future investigation may clarify this point.

De Takats has found that it is most satisfactory to aim the therapy of causalgia at the particular sensory level which seems to be involved(16,18). Thus, in early cases, local novocaine injections into any trigger points would represent attack upon the first neuron level. Interruption of the sympathetic reflex arc by novocaine injection about the regional paravertebral ganglia would represent therapy directed toward the second neuron level. Paravertebral sympathetic ganglionectomy has been used when novocaine injection has produced temporary but not permanent relief(2,7,8,11,17,19). Posterior rhizotomy and chordotomy(20) are also classified as therapeutic attacks on the first and second neuron levels, respectively, and have been used successfully when other more conservative measures have failed. When the condition reaches the third neuron level, ablation of the sensory cortex supplying the painful area, or prefrontal lobotomy becomes necessary(21).

These methods have all been used where

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21. (a) de Gutierrez-Mahoney, C. G.: The Treatment of Painful Phantom Limb by Removal of Postcentral Cortex, J. Neurosurg. 1:156-162 (March) 1944; (b) White, J. C.: Pain after Amputation and Its Treatment, J.A.M.A. 124:1030-35 (April 8) 1944.

indicated, with varying degrees of success. Injection of trigger points with novocaine is a simple procedure that may give some relief in early cases. Injection or excision of a paravertebral ganglion is relatively easy to do and is frequently effective in treating a lesion of the second neuron level. Other procedures are directed toward cutting the sensory tracts from the area involved and permanently removing all reception of pain and temperature from the area.

It is important that active exercise and physiotherapy be used in combination with any method of treatment employed, because it is only by use that the affected part will regain its normal appearance and function. The various types of treatment described above serve mainly to relieve the pain and some of the swelling; the patient is then capable of working out the stiffness and restoring the part to normal by his own activity.

### *Tetra-ethyl-ammonium chloride (Etamon)*

During the past year or so a new therapeutic agent, tetra-ethyl-ammonium chloride, has become available for investigational use in the treatment of causalgia and related phenomena(22). The experimental work of Acheson and Moe and subsequent clinical data, gathered largely from the departments of surgery, medicine, and pharmacology of the University of Michigan, have demonstrated that the chief property of tetra-ethyl-ammonium chloride is that it acts as a "blockade" of both the sympathetic and the parasympathetic divisions of the autonomic nervous system(23). The wide scope of its possible uses in medicine and surgery is immediately obvious, and it has been tried with considerable success in a large number of conditions known or thought to be on a basis of disturbance of the sympathetic nervous system. Our experience with its use has been limited chiefly to causalgia and related phenomena. While we have not yet gathered a large enough series upon which to base statistics, our present impression of the drug is sufficiently favorable to warrant a preliminary report.

The drug may be given intravenously or intramuscularly with equal effect(22a). It provides a much simpler method of therapy, for both the patient and the physician, than paravertebral sympathetic block, and we believe that in certain cases it is at least as effective. It has served as a valuable preoperative test for the effectiveness of sympathectomy in vascular diseases where permanent sympathetic block was thought advisable. Perhaps of greater importance, however, its administration has apparently resulted in permanent relief of pain in certain reflex sympathetic dystrophies.

Its action in these cases is to interrupt temporarily the sympathetic "reflex," or the constant bombardment of painful impulses being transmitted to the cord, which de Takats and other observers have indicated may be the underlying neuropathology of causalgia(13,16). The repeated temporary interruptions of the reflex apparently result in a permanent cessation of the flow of the aberrant sensory impulses, just as do repeated paravertebral sympathetic blocks by novocaine. It is too early to say whether or not the pain of these syndromes will return later and require another course of treatment. Other published work on the treatment of such conditions with local injections of novocaine and with paravertebral block indicates that it may(8), but the fact that it might is no reflection on the efficacy of the drug.

Harmful side effects of the drug are minimal and temporary, and its use is apparently without danger. There is usually a drop in blood pressure and a rise in pulse, a metallic taste in the mouth, some blurring of vision, occasionally slight nausea, tingling in the extremities, and vague dizziness or sleepiness. These effects usually pass off in half an hour after intravenous administration; they are less marked but last longer after intramuscular injection. If any ill effects should develop they can be immediately counteracted by the use of adrenalin(22a).

Data on the use of this drug in a number of orthopedic conditions, including causalgia and other neurocirculatory phenomena, will appear in a later report. The following

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22. (a) Berry, R. M. et al.: The Use of Tetra-Ethyl-Ammonium in Peripheral Vascular Disease and Causalgic Disorders 20:525-535 (Oct.) 1946; (b) Coller, F. A. et al.: Tetra-Ethyl-Ammonium as an Adjunct in the Treatment of Peripheral Vascular Disease and Other Painful States, Ann. Surg. 125:729-753 (June) 1947; (c) Hoobler, S. W. et al.: The Effect of Autonomic Blockade with Tetraethylammonium on the Renal Circulation in Dogs and in Normal and Hypertensive Patients, Univ. Hosp. Bull. 13: 9, 1947.
23. (a) Acheson, G. H. and Moe, G. K.: The Action of the Tetra-Ethyl-Ammonium Ion on the Mammalian Circulation, J. Pharmacol. & Exper. Therap. 87:220-224 (Sept.) 1946; (b) Acheson, G. H. and Moe, G. K.: Some Effects of Tetraethyl Ammonium on the Mammalian Heart, ibid. 84: 189-195 (June) 1945; (c) Acheson, G. H. and Pereira, S. A.: Action of Tetraethyl Ammonium Bromide on the Mammalian Neuromuscular System, Fed. Proc. 5:161, 1946.

rather dramatic case reports, however, will serve to indicate what may be expected from the drug.

### *Case Reports*

#### *Case 1*

A 64-year-old white male had his right leg amputated below the knee for peripheral arteriosclerotic gangrene in October, 1945. The wound did not heal, and another amputation was done at a slightly higher level in December, 1945. Nine days after this last operation he began to complain of "cramping pain" in the right stump. He was discharged from the hospital, however, on the twelfth postoperative day, with a healed amputation stump. He was followed in the outpatient department for the next three months, and continued to complain of pain of a "cramping" nature in the right stump.

In April, 1946, he was admitted to the County Home with a diagnosis of "phantom pain following amputation of right leg." This pain persisted for the next five months. It was present constantly, but there were exacerbations for which the patient required frequent sedation and local novocaine injections into the stump. In May, 1947, a paravertebral novocaine block of the sympathetic ganglia from the twelfth thoracic to the fourth lumbar ganglia inclusive was done, with considerable relief of symptoms for about eight hours.

Beginning July 29, 1947, tetra-ethyl-ammonium chloride was injected intravenously, in doses of 500 mg. daily, for five consecutive days. He noted no response to his first injection, but following the second intravenous injection he felt that the pain was greatly ameliorated. This relief lasted about eighteen hours. Following the third injection the pain did not recur, and has not returned to date—a period of twenty-six days.

#### *Case 2*

A 45-year-old white female fell on January 14, 1947, injuring her right wrist and elbow. She did not see a physician until two weeks later, when she was complaining of pain, limited motion, and swelling in the elbow, wrist, and hand. At that time x-rays showed a fracture of the head of the radius without displacement, but no bony injury in the wrist. Gentle active use was advised, and a sling was worn for protection. Swelling and pain continued, and motion became more limited in spite of the use of gentle massage and exercise.

She was admitted to the hospital on April 11, 1947, with a red, swollen, shiny wrist and hand, and a moderately swollen elbow. Motion in the extremity was as follows: 25 per cent of normal in her fingers, 0-degree pronation and supination of the forearm, 10-degree flexion and extension of the wrist, 30-degree flexion and extension of the elbow. She was given 400 mg. of tetra-ethyl-ammonium chloride intravenously on each of five successive days, and advised to use the hand actively all she could.

By the end of the fourth injection the pain was gone, except for that which accompanied active stretching of the stiff joints. She then had 75 per cent of normal motion in her fingers, 45-degree pronation and supination of the forearm, 20-degree flexion and extension of the wrist, and 45-degree flexion and extension of the elbow. She was discharged after the fifth injection with instructions to continue active use of the extremity.

On May 21, 1947, she had about 80 per cent of normal motion in the fingers, 70-degree pronation and supination of the forearm, and 100-degree flexion and extension of the elbow.

When last seen on August 21, 1947, she had 90 per cent of normal use of her fingers, normal range of flexion and extension of the wrist, and normal range of flexion and extension of the elbow except for the last 5 or 10 degrees of extension. She had no pain and was working full time without any complaint.

### *Summary*

Causalgia or reflex sympathetic dystrophy has been discussed from the standpoint of etiology, signs and symptoms, and treatment. The orthodox methods of treatment have been reviewed, and a new method employing tetra-ethyl-ammonium chloride described. Case reports indicating its efficacy have been presented.

# Maternal Welfare Section

## CASE REPORTS FROM THE MATERNAL WELFARE RECORDS*

### *Postpartum Hemorrhage*

The completed records of the maternal deaths which occur in the state of North Carolina provide interesting case histories demonstrating common obstetric problems. The two records which follow are typical examples of the problem of postpartum hemorrhage. The first case was considered a preventable death; the second an unavoidable fatality.

#### *Case 1—N.C.M.W.C. 14*

The patient was a 35-year-old white woman who had had 10 pregnancies and 2 abortions. She had had severe postpartum hemorrhages following her last two deliveries. The patient did not seek prenatal care, and was seen by her physician for the first time at the onset of labor. His examination revealed no gross physical abnormalities and no evidence of toxemia. Facilities were not available for laboratory examination of the blood and urine.

The patient was delivered at home, following a labor of fourteen hours with the fetus in the occiput posterior position. The labor was characterized by short, weak uterine contractions. Complete dilatation of the cervix occurred in eleven hours, and the physician waited three hours for rotation of the fetal head and a spontaneous termination of labor. Moderate bleeding occurred throughout the entire second stage of labor. Sedation consisted of 100 mg. of demerol, and delivery was effected under ether anesthesia with low forceps. The head was rotated to an occiput anterior position; the forceps were then removed and reapplied. A normal male child of average size was delivered without difficulty. No demonstrable laceration was present.

The placenta was delivered without difficulty approximately ten minutes after the baby was born.

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*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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|---|---|
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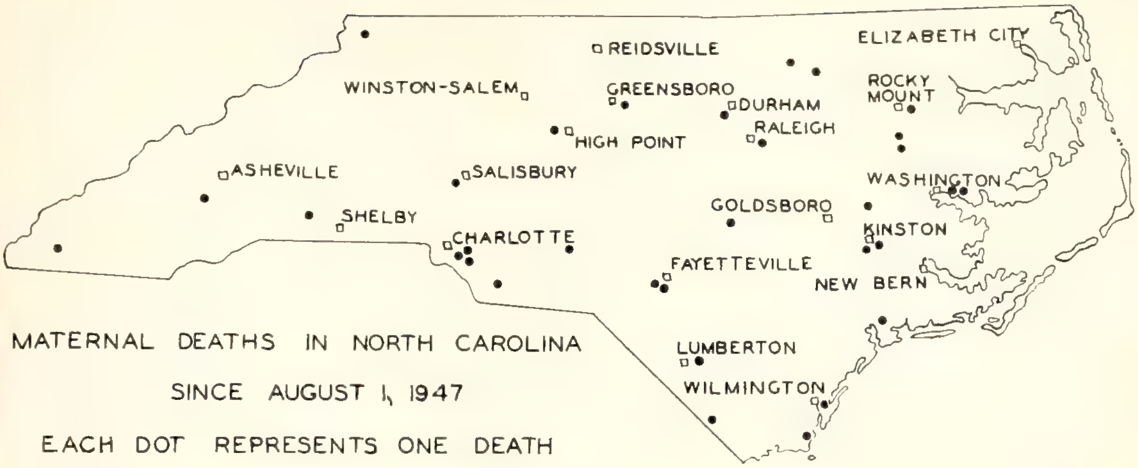

MATERNAL DEATHS IN NORTH CAROLINA
SINCE AUGUST 1, 1947
EACH DOT REPRESENTS ONE DEATH

Immediately following the delivery of the placenta, a sudden, profuse hemorrhage occurred. With vigorous massage of the uterus, the physician was able to obtain some contraction of the uterus. Relaxation occurred immediately when he stopped holding the uterus, however, and it became soft and boggy. The physician was unable to control the bleeding for twenty to thirty minutes, and finally checked it by packing the vagina tight with cotton, which was the only available material. The vaginal pack was left in place for eight hours, during which no apparent bleeding occurred. It was then removed, and the decision was made to send the patient to a hospital for a blood transfusion. She died in the hospital, fourteen hours after delivery, before she had been given any blood.

### *Discussion*

The Maternal Welfare Committee considered this death one which should have been easily preventable. That it was not prevented is the fault partly of the patient and partly of the physician. Had the patient sought prenatal care, the history of previous postpartum hemorrhages and grand multiparity certainly would have demanded a hospital delivery with adequate safeguards—compatible blood, uterine packing, and preparations for hysterectomy.

On the other hand, her attendant had sufficient advance information to have taken the above precautions. The Committee realizes that the majority of deliveries in North Carolina are in the home, where adequate facilities are lacking. Whereas this is predominantly a social problem, the physician has a definite responsibility. He must insist that the complicated obstetric cases be hospitalized! Furthermore, it is difficult to understand why adequate packing material was not included in the physician's equipment.

A history of previous postpartum hemorrhage is always significant, and the presence of uterine inertia during the first and second stages of labor predisposes to postpartum hemorrhage. We have repeatedly quoted Eastman's warning concerning the increased danger of pregnancy to a grand multipara. The maternal death rate increases ninefold after the ninth pregnancy.

The Committee considers it an obligation of any physician practicing home obstetrics to be prepared for the management of postpartum hemorrhage, which is certain to occur at times. This preparation includes having readily available oxytocic drugs—posterior pituitary extract and injectable ergot preparations. Blood plasma is stable and should be a part of the obstetric equipment of any physician. A uterine pack, composed of three or four layers of gauze 10 yards in length and 2½ to 3 inches in width, can be kept sterile indefinitely in a hermetically sealed fruit jar and carried for such an emergency. The packing must be placed in the uterus rather than the vagina. A vaginal pack may serve simply to conceal the loss of blood by damming it up in the cavity of a relaxed uterus.

A patient's chance of survival following a profuse hemorrhage of any type bears a direct relation to the time elapsing between the loss of blood and its replacement by transfusion. It is apparent in this case that the physician underestimated the severity of the blood loss, since there was a delay of eight hours before he sent the patient to a hospital for blood transfusion. The fact that she survived, without a transfusion, for an additional six hours after reaching the hospital suggests that she might have been saved if a transfusion had been given as soon as she arrived. Apparently lack of facilities or personnel, or some other factor, further delayed the transfusion which might have saved her life.

### *Case 2—N.C.M.W.C. 167*

The patient was a white woman, 24 years of age, who was in her second pregnancy. The first terminated in an early spontaneous abortion. Her general condition was excellent; the history, physical examination, and laboratory tests revealed no abnormality. At the thirty-sixth week, she suddenly passed a large amount of bright red blood from the vagina without pain. When she was admitted to the hospital an hour later, the bleeding had stopped and uterine contractions were occurring every five to ten minutes.

Blood was obtained for transfusion as soon as she was admitted to the hospital. She was properly prepared and a sterile vaginal examination was done in the delivery room. The cervix was found to be soft and dilated 2½ to 3 cm. The membranes were intact. The placental edge was felt about 2 cm. from the anterior margin of the cervix. Examination caused no increased bleeding. A vertex presentation was present, the head fitting well into the cervix and pelvis. Rupture of the membranes was selected as the preferred method of treatment. Four hours after admission, a premature, living male child weighing 4 pounds, 11 ounces, was delivered spontaneously. Some bleeding began immediately following delivery, but stopped when the placenta was expressed intact without difficulty. The patient received 500 cc. of whole blood by transfusion.

One hour after delivery she began to have mild bleeding which did not respond to oxytocic drugs and uterine massage, although the uterus was firmly contracted. She was returned to the delivery room, and the uterus and vagina were packed firmly with sterile gauze. A second transfusion of 500 cc. of blood was given while she was in the delivery room. Her pulse rate increased from 100 to 110 and her blood pressure was only 100 systolic, 70 diastolic. For these reasons she was given 500 cc. of plasma and a third transfusion of 500 cc. of whole blood. She was returned to her room in good condition. Half the packing was removed in twenty-four hours, and the other half thirty-six hours after her delivery.

On the second postpartum day, she had a severe chill and her temperature rose to 105 F. She was given penicillin, 50,000 units every two hours intramuscularly, and sulfadiazine, 1 Gm. every four hours orally. Her temperature returned to normal the fourth postpartum day. On the third day, when her blood count revealed a hemoglobin of 60 per cent and 2,830.000 red blood cells, she was given her fourth transfusion of 500 cc. of whole blood.

On the fourth, fifth, and sixth postpartum days, her temperature was normal and her condition excellent. A rise in temperature to 101.4 F. was noted on the seventh day, and recurred on the eighth and ninth postpartum days. Penicillin again was administered. On the tenth postpartum day, she was given a fifth transfusion of 500 cc. of whole blood after it was found that her hemoglobin and red cell count were essentially unchanged by the previous blood transfusions. Later in the day, while using the bed pan, the patient suddenly had a profuse vaginal hemorrhage, filling the bed pan with clots. She went into profound shock, and her blood pressure and pulse could not be obtained. Blood plasma and whole blood were started, one being given in each arm. Her hips were elevated, and a speculum was inserted to determine the point of bleeding. It was observed that the cervix was widely patent, essentially in the condition one would expect immediately **post partum.** When the anterior lip of the cervix was lifted, it became apparent that the old placental site was gangrenous and sloughing, with blood being lost from the entire area. Packing was placed against the bleeding area. Blood and plasma were continued by cutting down on veins in the ankles, and continuous oxygen was given. The patient never improved, however, and ceased to breathe while the fourth pint of blood and second pint of plasma were being given. The bleeding was not completely stopped by the packing, although no further profuse bleeding occurred after it was inserted.

### *Discussion*

It was the opinion of the Committee that this patient was given the benefit of every available medical treatment. The management of placenta praevia lateralis by rupture of the membranes with a spontaneous delivery is completely acceptable and is the most desirable treatment under the circumstances presented by this case. The patient was given transfusions in sufficient quantities, and her death from a delayed postpartum hemorrhage could not have been anticipated.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

Josiah C. Trent, M.D., F.A.C.S., *Editor*
Durham

## OBSTETRICS AND GYNECOLOGY IN AMERICA

### X

### JAMES PLATT WHITE (1811-1881)

James Platt White, who made great and varied contributions to obstetrics and gynecology, was born in Austerlitz, Columbia County, New York, on March 14, 1811. When he was 5 years of age, his parents moved to East Hamburg in Erie County, an area then frontier. White received a good English education and a fair training in the classics, and began the study of law. Shortly, however, he determined to take up medicine and, after teaching school for a time, entered upon a course of lectures at the medical school in Fairfield, New York. In 1834 he graduated from the Jefferson Medical College in Philadelphia, and the year following he established himself as a practitioner in Buffalo, New York. In this city, which was to be the scene of his long and busy career, he attained almost immediate success in his profession.

Largely as a result of Dr. White's exertions, the medical school of Buffalo was established. In this school, which later became the medical department of the University of Buffalo, Dr. White throughout his life held the posts of president of the council and professor of gynecology and obstetrics. He soon gained a wide reputation as a teacher and was the first to introduce clinical teaching in his classes at a time when theoretical, didactic teaching was the accepted form of student instruction. White's introduction of "demonstrative midwifery" met with violent opposition. In 1851 the American Medical Association's Committee on Education decided that White's clinical illustration of labor was entirely unnecessary for teaching purposes. White held to his practice, however, and was active in its dissemination, being instrumental in the founding of several teaching hospitals.

Thoms, in his work on American obstetrics and gynecology, gives Dr. White priority for the correction of chronic uterine inversion, despite the claims of others for Tyler Smith. Dr. White examined his first patient with chronic inversion of the uterus in 1842. The patient was not operated upon because at that time the leading teachers opposed operation. In 1856 White saw a woman, delivered eight days before by a midwife; the patient had an inverted uterus. Dr. White performed a manual reduction under chloroform, using also a rectal bougie. The reduction was successful, but the patient died of the marked anemia caused by the bleeding at the time of the inversion. White reported the case in the *Buffalo Medical Journal* in March, 1856. In the same year Tyler Smith, using no anesthesia, performed successful replacement of a uterus which had been inverted for twelve years. His report on the case was given on April 13, 1858, before the Royal Medical and Chirurgical Society of London.

In 1866 Dr. White visited Europe and saw Spencer Wells, Tyler Smith, Baker Brown, and other outstanding surgeons perform ovariotomy. In 1867, shortly after his return to Buffalo, he first attempted the operation himself. He soon achieved a wide reputation for skill as an ovariotomist and was frequently called upon to operate in distant parts of the country. He performed 115 ovariotomies in the course of his career.

In 1872, Dr. White described his uterine repositor. Aveling, writing in 1886, gave priority for this innovation to Tyler Smith, basing his decision on the fact that White had used a repositor with a spring. Thoms (1934) again accords priority to Dr. White, however.

Dr. White wrote many scientific articles, and a review of his bibliography is stimulating. He modified the obstetric forceps and advocated anesthesia in childbirth and the use of chloroform in eclamptic convulsions. In 1861 he published a biographic article on Samuel Bard, and in 1863 he prepared the section on pregnancy in Beck's "Medical Jurisprudence." In Buffalo he was instrumental in the foundation of many public institutions: he cooperated with Bishop Timon in the establishment of the Buffalo Hospital of the Sisters of Charity, the maternity and foundling hospitals, and the Providence Asylum for the Insane. He first proposed the founding of the State Lunatic Asylum, was largely responsible for its location in Buffalo, and was at first a manager, afterwards president, of the institution.

Dr. White's death, on September 28, 1881, closed the career of an able clinical teacher and keen investigator, whose true stature is revealed in his many accomplishments.

Bayard Carter, M.D.
Duke Hospital,
Durham, North Carolina

**The egalitarian philosophy of America** proclaims that all men are created equal, and, as the Irishman said, "One man is as good as another, or maybe a little better." In discarding the tradition of an aristocracy by birth, we have thrown out the very notion of quality. Now, plainly, some men **are** far better than others, for given functions, by hereditary endowment or acquired experience, and the public recognizes this well enough where it is familiar with the situation. It knows that a special combination of endowment and training is needed to make a Joe Louis, a Babe Ruth, or even a Paderewski, and it would rightly scoff at a professor of sociology who pontificated about pugilism. But the reverse is not true. The public does not know sufficient about scientific evidence and procedure to recognize as ludicrous the anthropological antics of Bilbo, the biological blather of Irene Castle ex-McLaughlin, or the chemical confusion of most literary atom bombardiers. The public does not know its scientific A.B.C.'s—and it doesn't know that it doesn't know! Even at the height of scientist prestige, in a technological war, America alone drafted its science students.—R. W. Gerard: Science and the Public, Science 106:24 (July 11) 1947.

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OCTOBER, 1947

## MISSION TO TOKYO

The greatest injustice done the South after the Civil War was not perpetrated by its military conquerors, but by the unscrupulous civilians who came in hordes to profiteer upon the defeated states. As a result of the prostitution of the state legislatures, all sorts of vicious laws were enacted. It has taken the South two generations to recover even partially from this period of carpetbag control.

A rather striking parallel may be drawn between the invasion of the South by the carpetbaggers and a recent invasion of Japan by a group of federal employees. The none-too-thinly disguised purpose of this so-called "mission" is to force upon the conquered Japanese a system of national compulsory health insurance—notwithstanding the fact that such a system has been repeatedly repudiated by the Congress of the United States. In a letter to Mr. Isidore Falk from one of his henchmen in Tokyo (Mr. W. H. Wandel) the statement is made:

> "We think that our need is for someone who is primarily not so much an economic analyst as one versed in health insurance. Health insurance is the major field of social security in Japan . . . Permanent revision requires amalgamating National Health Insurance with Health Insurance on a compulsory basis."

Representative Forest A. Harness, in a letter to his colleague John Taber, chairman of the House Committee on Appropriations, protested against the use of federal funds to finance this mission. All the members of the mission are permanent, full-time employees of the federal government and all are recognized as agitators for a national system of compulsory health insurance. In his letter Representative Harness makes eight charges against the Tokyo Health Mission:

> **"(1) That the health mission to Japan is composed entirely and exclusively of men long identified in the public record as advocates and proponents of Socialized Medicine not only in the United States but throughout the world.**
>
> **"(2) That the real purpose of this mission is to lay the groundwork for a system of Socialized Medicine in Japan.**
>
> **"(3) That the scheme for such a mission originated in the Division of Research and Statistics in the Social Security Board in Washington, and nowhere else.**
>
> **"(4) That the nominal request for the mission was engineered through the General Headquarters of the Supreme Commander in Tokyo by federal employees sent from Washington for that particular purpose.**
>
> **"(5) That General Douglas MacArthur does not favor—and does not approve—any plan to establish compulsory Socialized Medicine in Japan.**
>
> **"(6) That the dispatch of this mission to Tokyo for the purpose indicated in Mr. Wandel's letter to Mr. Falk under date of June 14, 1947, is a gross misuse of public funds.**
>
> **"(7) That the real purpose of the mission is not to assist Japan in working out her basic problems in health and welfare, but to force upon that country a compulsory system of Socialized Medicine.**
>
> **"(8) That although the questions here involved are of a health and medical nature, the Surgeon General of the United States Army was not consulted in reference to the problems involved."**

No doubt most doctors will agree with Representative Harness' comment:

> "I deem it inappropriate for federal employees, at the expense of the American taxpayer, to travel throughout the world preparing or assisting in the preparation of legislation to be adopted by foreign countries when similar legislation, long pending, has not been approved by the Congress of the United States."

Let us hope that the Communist fellow-travelers from Washington will not be allowed to do to Japan what the carpetbaggers did to the South after the Civil War.

## GOVERNMENTAL SUPPORT FOR RESEARCH

The preeminent place of American medicine in the world today is due in large part to the great number of new discoveries made in this country and the immediate application to practice of those with clinical implication. The educational system which fosters the discovery of new facts and the wide dissemination of new knowledge has as its keystone research. The recent withdrawal of several private philanthropic foundations from the financing of research through grants-in-aid warrants reflection on the causes which have led to this action and on its possible effects. One important cause is the large sums of money being appropriated to federal agencies for research. This factor is leading to a change in the research programs of educational institutions which may not be wise from the long-range point of view.

The success of a research program depends upon the scientific manpower available. The number of scientists who have the peculiar aptitudes required to perform good basic research is strictly limited. The *sine qua non* for a good research scientist is a never-ending succession of ideas which can be subjected to critical scrutiny or experimental evaluation. Individuals with this quality should be encouraged to continue their endeavors and should be protected from the economic necessity of drifting into practice to support their families. Since the number of people able and willing to conduct research is limited, a competition has developed between governmental agencies and private foundations for their services. The government's potentially unlimited funds, drawn from the public's pockets, make this competition so one-sided that the private foundations are leaving the field. At least one foundation has changed its emphasis to the support of individual young investigators—the man rather than the problem. Another foundation is seriously considering withdrawal from the support of any phase of the medical sciences.

The importance of the role of the private foundation should not be judged by the amount of money which it distributes. The total funds available yearly may be small when compared with governmental funds, but they are usually spread widely among many institutions. The scientific director of such a foundation is usually a man of broad vision and experience who can assure continuity in a line of research over a period of years, and can correlate the activities of several investigators in the same field. The foundations tend, unofficially, to familiarize themselves with one another's work, so that duplication is avoided. The pressure upon the scientist to produce immediately apparent results is not great, since the boards of trustees usually do not require justification from the director for continuation of individual grants.

The foundations have recognized that the large educational institutions do not have a corner on brains. They have done much to encourage young investigators working in small and less well known institutions.

Governmental agencies have pursued a different course. During the war dramatic results were often obtained through the use of federal funds when a definite answer to a specific problem of immediate military importance was needed. Such investigations utilized personnel and facilities already operating in medical schools and institutes; the investigations were supported by contracts made with the Office of Scientific Research and Development (OSRD). The success of this program has led the government to presume that the simple appropriation of larger amounts of money will assure a corresponding increase in scientific accomplishments. Nothing is further from the truth; the limiting factor of the availability of trained manpower looms too large.

The success of the OSRD program has tended to focus attention on "practical" research which may have immediate application to clinical practice, rather than on "pure" basic science. Since a bureaucrat must justify his allotment of funds by a record of contributions to medical literature resulting from the investigation, this trend will inevitably be strengthened. Research in pure science may not produce immediate positive results, and hence will receive less support. Similarly, funds will not likely be offered unless the proposed problem promises results; the bureaucrat cannot afford to take a "flyer" on a problem where the return may be large if the research is successful, but where the risk of complete failure is very great. In spite of the protestations of the governmental agencies that they will support research for its own sake, the scientist is frequently "advised" to slant his application for funds toward the work of the agency with which he is negotiating.

Multiple agencies of the government have money for research which they must spend in a given time to justify a continuation of their appropriations. The large sums of money now becoming available have created a competition between agencies for the distribution of such funds. Since scientists are human, they will be likely to accept funds from the agency offering the most liberal budget, and they may even accept multiple grants from several sources to work on various aspects of the same general problem. The result is that a man may spread his efforts too thin to be most effective, and the quality of his work may drop. In addition, the primary investigator is apt to push young men of promise beyond their capabilities, to avoid losing a governmental grant.

The availability of funds for specific projects tends to lure scientists into fields other than those with which they are familiar. If all the funds requested for cancer research, for example, are appropriated, it is doubtful that enough scientists intimately familiar with the problem are available to spend more than a fraction of the money on ideas of reasonable promise. The amount of money which can be intelligently spent on a given project often is quite small.

The constant shifting of governmental personnel, especially those in military service, prevents the development of administrators with broad experience and knowledge of the capabilities of individual investigators and the trends in research. The lack of familiarity and continuity has led to a tendency to continue support of investigations begun under a previous administrator and to concentrate funds in the large institutions under men of prominent reputation — the big names. Often the evaluation of previous results is not as critical as is the case under private foundations.

The success of the previous government program under OSRD has led to proposals for the establishment of tremendous research institutes by several of the governmental agencies. Continuation of the trend on the scale hinted by the army's request for a $40,000,000 center would seriously disrupt the research program in civilian institutions. The small reservoir of trained personnel in such institutions would be drained, since medical schools and research centers would find it difficult to compete with the government. Easier work, shorter hours, greater facilities, and more liberal retirement and pension plans are potent drawing cards. Furthermore, if the government sets up its own research centers, it may withdraw entirely its support of research projects in private institutions, such as medical schools. These institutions may then find themselves without any financial support, the foundations having previously withdrawn and committed their funds elsewhere.

It would appear, therefore, that the present trend away from dependence on private foundations for support of medical research is not wise. A continued broad interest in scientific investigation by administrators of private funds is urgently needed to prevent its control from passing to the government by default.

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## DR. WILLIAM SEAMAN BAINBRIDGE

The passing of Dr. William Seaman Bainbridge of New York City, on September 22, leaves only six men in the United States who can claim the distinction of being honorary members of the Medical Society of the State of North Carolina: Drs. James K. Hall, Paul V. Anderson, and Stuart McGuire, of Richmond; Dr. R. L. Payne, Jr., of Norfolk; Dr. Fred Rankin, of Lexington, Kentucky; and Dr. William Sharpe, of New York.

Dr. Bainbridge was a lifelong student, a medical philosopher, and a charming companion. The NORTH CAROLINA MEDICAL JOURNAL for December, 1944, published one of his last papers, "Our Debt to the Aging" —an address to the second meeting of the American Geriatrics Society. Those who have a copy of that issue will be well repaid for reading this article over again.

In Dr. Bainbridge's passing American surgery loses a distinguished representative, and the Medical Society of the State of North Carolina loses a good friend.

# Clinicopathologic Conference

## Bowman Gray School of Medicine of Wake Forest College

The patient was a 48-year-old white male who entered the North Carolina Baptist Hospital for the first time on December 2, 1946. He had been in good health until six months previously, when he first noted nodules in the right side of the neck, together with malaise and fever up to 101 F. Because of these symptoms he consulted his local physician. A biopsy of a node from the neck was reported as showing Hodgkin's disease. The patient's weight had fallen from 145 to 118 during the past six months, and he had had pruritus over various parts of his body for this length of time. The areas of skin involved usually showed small papules. He was given twenty-six x-ray treatments over various portions of the body during a period of two months. He entered the hospital because of dull aching pain in the left lower quadrant of the abdomen. He had also had pain in the left upper quadrant and mid-epigastric region after meals at times for the past year. He belched a great deal and occasionally vomited.

Physical examination revealed a poorly nourished male. A few cervical lymph nodes were palpable. Axillary nodes were small but easily felt. Inguinal and femoral nodes were enlarged and firm. There were several small nodes on the left side of the abdomen which were easily movable. The lungs were clear. The liver and spleen were not palpable.

Urinalysis was essentially negative. The hemoglobin was 13 Gm., the white cell count 11,000. Serum proteins were 6 Gm. per 100 cc. An x-ray of the chest showed the right lung field to be clear. There were several nodular areas of increased density in the left upper lung field with fibroid changes radiating toward the hilar region and the extreme apex. These changes were compatible with the diagnosis of Hodgkin's disease.

The patient was treated with antireticular cytotoxic serum, being given 0.5 cc. on December 6, 1 cc. on December 9, and 1.5 cc. on December 12. He was discharged, symptomatically improved, on December 13, 1946.

The patient entered the hospital again on January 2, 1947, for further therapy with antireticular cytotoxic serum. Physical examination revealed a few small, hard, discrete nodules in the right cervical region and in both inguinal regions. The axillary glands were not palpable. The lungs were clear. The liver and spleen were not palpable. In the left upper quadrant there was a hard, fixed, non-tender mass about the size of a small egg. There were also some small, ill-defined masses palpable in the epigastric area. The patient was discharged on January 12, after receiving the serum.

He entered the hospital for the third time on May 13, 1947. He had lost about 12 pounds in weight since February. Three and a half months before this admission, an abscess had developed near the anus and had drained spontaneously until the first week of May. He had continued to have a poor appetite, but had noted no melena. He had had a slight cough productive of about an ounce of grayish sputum per day, since an upper respiratory infection on April 20. There had been no hemoptysis and no chest pain.

Physical examination revealed a moderate dacryocystitis on the left. The lymph nodes had not changed. Examination of the chest revealed bilateral wheezing inspiration and expiration, especially at the apices, and a few coarse rales at the apices. The liver and spleen were not felt, and no abdominal tenderness was noted.

The urine showed a faint trace of albumin and occasional white blood cells. The Fishberg test showed a maximum concentration of 1.031. The hemoglobin was 12.5 Gm., the red cell count 4,250,000, the sedimentation rate (corrected) 36 mm. in an hour, and the white cell count 12,900 with 78 per cent segmented polymorphonuclears, 2 per cent nonsegmented, 1 per cent eosiniphils, 1 per cent basophils, 12 per cent lymphocytes, and 6 per cent monocytes. The nonprotein nitrogen was 33 mg. per 100 cc., the total serum proteins 5.8 Gm. (albumin 3.5 Gm., globulin 2.3 Gm.). The Kahn test was negative, and the stool examination was negative.

An electrocardiogram was reported as showing no evidence of myocardial disease. An x-ray of the chest made on May 14 showed a mottled density in the left apex extending to the lower body of the second rib, which appeared somewhat honey-combed in type. There was also a minimal amount of similar infiltration in both bases. The report stated: "The nature of this infiltration cannot be definitely determined by x-ray alone. The location of the lesion in the left upper field suggests the possibility of tuberculosis. Scattered areas of rarefaction are seen in several of the ribs bilaterally. The significance of this finding is not evident." X-rays of the chest on May 19 and June 18 were reported as being unchanged. An x-ray of the chest on June 23 showed a spreading of the previously described bilateral pulmonary infiltration. The x-ray diagnosis was "probable tuberculosis, spreading."

The patient's temperature ranged between 99 and 102.4 F. rectally, and his pulse rate remained elevated. Many concentrated sputum examinations were done for acid-fast bacilli, and on May 15, 20, and 21 several acid-fast bacilli were found. His main complaint throughout the hospital stay was increased dyspnea. He developed moderate edema of the presacral area, of the lower extremities, and of the hands. The total serum proteins on June 6 were 5.2 Gm., with an albumin-globulin ratio of 2.2. The patient was digitalized five days prior to death, but with little improvement. He died quietly on June 26.

### *Discussion*

Dr. David Cayer: This 48-year-old man entered the North Carolina Baptist Hospital in the sixth month of a progressive, fatal illness of one year's duration. His history at that time may be summarized by stating that, following the appearance of enlarged lymph nodes in the right side of the neck, which his local physician found to be a manifestation of generalized lymphadenopathy, his illness was characterized by malaise, low-grade fever, and progressive weight loss. It would be of some help to know whether or not the liver or spleen was palpable at the onset, as well as how much x-ray therapy was given, whether it was directed over the liver or spleen, whether a chest plate was made, and, if so, what the findings were. This information, however, is not available.

At the time of admission here the patient's complaints were largely referable to the gastrointestinal tract, and consisted of pain in the left side of the abdomen, epigastric discomfort after meals, and occasional vomiting. These symptoms direct our attention to the abdomen and gastrointestinal tract, and to a consideration of the possibility that they may have represented a primary malignancy in the abdomen, rather than a part of the clinical picture already diagnosed by biopsy as Hodgkin's disease. The most frequent abdominal malignancies can be fairly well ruled out on the basis of the history and findings at the time of admission. Carcinoma of the stomach, which would be the most likely malignant lesion on the basis of frequency, is ruled out by the primary lymph node enlargement in the right side of the neck. The thoracic duct drains the abdomen and is responsible for the appearance of nodes in the left side of the neck, particularly the so-called Virchow's node. There is no direct lymphatic connection from the abdomen to the right side of the neck, and therefore the right-sided lymph node enlargement without anemia or the finding of occult blood in the stool would make carcinoma of the stomach unlikely. Carcinoma of the body of the pancreas can be ruled out by the same reasoning. The absence of a previous history suggestive of chronic cholecystitis or cholelithiasis, as well as the duration of the illness without liver enlargement or jaundice, would rule out gallbladder malignancy, since local metastases are early and most common. The negative stool findings and the lack of anemia or manifestations of obstruction or toxicity also pretty well eliminate the possibility of a primary cancer of the colon or rectum.

The patient was admitted in December and again in January for treatment with antirecticular cytotoxic serum. Dr. George Harrell and members of the medical house staff have been interested in using this in Hodgkin's disease, and I hope he will say a few words on the subject. The patient's course after he was discharged from the hospital was progressively downhill. He continued to lose weight and developed an abscess near the rectum which drained for several months. In view of the terminal pulmonary findings, we might conjecture that this represented a tuberculous abscess. The duration of drainage would fit this impression, but in the absence of smears or cultures an absolute diagnosis can not be made.

It is worthy of note that during the six months the patient was observed in this hospital his laboratory findings underwent little change. The hemoglobin remained at approximately 80 per cent and the red cell count at 4,250,000. The white cell count changed little, although the sedimentation rate was indicative of infection or malignancy, or perhaps both. Although the total serum proteins showed a slow but progressive fall, other examinations of the blood, as well as stool examinations, urinary concentration studies, and an electrocardiogram were within normal limits. X-ray examinations of the chest showed a progressive pulmonary infiltration which was most suggestive of tuberculosis. This impression was confirmed by the demonstration of acid-fast bacilli in concentrated sputum specimens on three separate occasions.

It seems, then, that the clinical data, as well as the accessory studies reported from the departments of pathology and roentgenology, substantiate two diagnoses in this case—*Hodgkin's disease* and *pulmonary tuberculosis.*

The repeated inability to palpate the spleen would make one somewhat suspicious of the former diagnosis, since splenomegaly is demonstrable clinically in about 75 per cent of patients with proven Hodgkin's disease. The absence of this finding does not, however, rule out this condition.

The simultaneous occurrence of Hodgkin's disease and tuberculosis is not uncommon. About six months ago at a clinicopathologic conference I made a similar diagnosis, which proved to be only half right, when Dr. Thomas presented an instance of histoplasmosis and pulmonary tuberculosis(1). Following that conference I reviewed Dr. Parsons' excellent paper on histoplasmosis(2) and was impressed with the marked clinical similarity of Hodgkin's disease and histoplasmosis. Several of the cases reported by the author had histories which could easily be substituted for that which was given here. In several instances histoplasmosis was found to be associated with pulmonary tuberculosis, and in one case with Hodgkin's disease. The author states that the diseases which must be most frequently differentiated from histoplasmosis are tuberculosis and Hodgkin's disease, as well as aleukemic leukemia and malignant neoplasms. Although histoplasmosis might be a possibility in this case, I would be most reluctant on the basis of probability alone to make such a diagnosis.

The gastrointestinal complaints which first brought the patient to the North Carolina Baptist Hospital are possibly unrelated to either Hodgkin's disease or tuberculosis. Tuberculosis of the stomach is said to be one of the rarest of tuberculous lesions, and Bockus speaks of Hodgkin's disease of the stomach as "exceedingly rare." It is entirely possible that this man had a related or even an unrelated disease of the stomach, but the clinical data will not justify a more specific diagnosis.

I do not see how the clinical manifestations of generalized lymph node enlargement, fever, progressive weight loss, pruritus, and papular involvement of the skin, as well as the roentgenographic changes in the lungs and the finding of acid-fast bacilli in the sputum on three separate occasions, can be interpreted except to make the diagnoses of (1) *malignant lymphoma of the Hodgkin type*, and (2) *pulmonary tuberculosis.*

*Dr. Cayer's diagnoses*

Malignant lymphoma of the Hodgkin type
Pulmonary tuberculosis

DR. GEORGE T. HARRELL (Internist): The etiology of Hodgkin's disease has been a source of controversy. The disease is thought by some investigators to be due to a tumor, while others have favored an infectious etiology. Many varied organisms have been recovered from the lymph nodes in Hodgkin's disease; it is generally agreed that the tubercle bacilli found in some instances are secondary invaders which have settled out in damaged tissue. Whether the Brucella recovered from patients with Hodgkin's disease represent the primary etiologic agent or a secondary invader is still a moot point(3). It was hoped that the studies with antireticular cytotoxic serum (ACS) might shed some light on this controversy.

It is a well-known biologic fact that harmful substances administered in small doses may have a stimulating rather than a toxic effect. This principle is true in the administration of drugs. Bogomolets, a Russian, prepared an antiserum using reticulo-endothelial cells as the antigen(4). He assumed

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1. Cayer, David and Thomas, W. C.: Clinicopathologic Conference, North Carolina M. J. 8:42-46 (Jan.) 1947.
2. Parsons R. J., and Zarafonetis, C. J. D.: Histoplasmosis in Man, Arch. Int. Med. 75:1-23 (Jan.) 1945.
3. Forbus, W. D., Goddard, D. W., Margolis, G., Brown, I. W., and Kerby, G. P.: Studies on Hodgkin's Disease and Its Relation to Infection by Brucella (Abstract), Am. J. Path. 18:745-748 (May) 1943.
4. Bogomolets, A. A.: Anti-Reticular Cytotoxic Serum as a Means of Pathogenetic Therapy, Am. Review of Soviet Med. 1:101-112 (Dec.) 1943.

that the antibody resulting from injection of this antigen was specific against this type of tissue cell. On the basis of this theory, the administration of such an antiserum in stimulating doses should make the patient worse if Hodgkin's disease is a tumor. If the disease is an infection, the stimulation of the phagocytic cells should result in clinical improvement which might be confirmed by objective evidence. Since Brucella have been recovered from cases of Hodgkin's disease in North Carolina(3), a study of the immune status of patients with the disease, before and after the administration of ACS, was done. The initial report on the studies was made to the Southern Medical Association in November, 1945.

Various physiologic studies were also done to observe the effect of ACS on patients with Hodgkin's disease. The number of mononuclear cells in the blood, the stimulation of tissue macrophages—as judged by the spread of a particulate dye—, the size of histamine wheals, the changes in the sedimentation rate and Weltman reaction, and the serum proteins were followed. No change was found in the status of immunity to Brucella. Minimal changes were found in the sedimentation rate; showers of monocytes were observed, but such showers occur spontaneously in other diseases of the reticulo-endothelial system, such as sarcoid.

Clinically several patients appeared to obtain temporary benefits from the administration of the serum, as judged by increase in the sense of well-being and by the ability to return to work. One patient had an exacerbation of symptoms and died very quickly following the administration of the serum. The patient under discussion tonight noted little change.

The principle involved in the use of this material is extremely fascinating. One would usually interpret results obtained from serum prepared in this fashion as being due to an effect against a species of animal—the human being—, rather than an effect against a particular type of cell. Additional studies must be done before a definite opinion on the value of ACS in the treatment of Hodgkin's disease can be given.

Dr. Luther Jarvis (Roentgenologist): Serial films of the chest over a period of nine months prior to the patient's death showed progressively increasing, soft, patchy infiltrations in the left upper lobe, which, at the onset, had the appearance of residual fibroid changes from either tuberculosis or a treated Hodgkin's disease. During the last month the disease became widespread and involved the right lung. There was no apparent mediastinal lymphadenopathy. The pulmonary changes could be due to tuberculosis, Hodgkin's disease, or a combination of the two.

### *Anatomic Discussion*

Dr. W. C. Thomas: The anatomic findings in this case were widespread, but involved chiefly the reticulo-endothelial system. The mesenteric and preaortic lymph nodes were enlarged to the size of walnuts; the capsules of the lymph nodes were somewhat adherent. Both lungs presented areas of consolidation and cavitation; grayish-white miliary lesions were noted in some portions of the lung tissue. The liver and spleen presented grayish-white miliary foci on their cut surfaces. The wall of the stomach appeared to be thickened; an ulcer measuring 1 cm. in diameter was found on the lesser curvature of the stomach 2 cm. from the pyloric end.

Microscopic examination showed typical tubercles, containing acid-fast bacilli, in the lungs, spleen, and liver. In other portions of the lungs, liver, spleen, and stomach, and in the lymph nodes of the mesenteric and preaortic regions, there was a granulomatous reaction characterized by eosinophilia, fibrosis, and the presence of giant cells of the Reed-Sternberg type.

This case illustrates the difficulty in separating the effects of a specific disease, such as tuberculosis, on the reticulo-endothelial system from those of a clinical syndrome involving the reticulo-endothelial system, as is noted in Hodgkin's disease. The whole question of the specificity of tissue reactions is raised by a case of this type. It is obviously not answerable unless one assumes a broad biologic and philosophic point of view. The inter-relationship of tuberculosis and Hodgkin's disease has been the subject of numerous papers in the past few decades.

### *Anatomic Diagnoses*

*Tuberculosis, miliary, involving the liver and spleen; tuberculous bronchopneumonia of both lungs with cavitation.*

*Hodgkin's disease, diffuse, granulomatous, of the lungs, lymph nodes, liver, spleen, and stomach.*

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

NEGLIGENCE: *A physician is not absolved from liability solely because he was not engaged or retained by the patient himself. A mistake in diagnosis is actionable if the physician is negligent in making the examination.*

In this case a physician was sued for making an error in diagnosis. The records show that the doctor was summoned by a county official to attend a man who was arrested, allegedly, because of drunkenness. At the time the doctor visited the prisoner, he was confined to the common jail of the county where the arrest occurred. The prisoner died on the day following his arrest and confinement. It was contended by the widow of the decedent, who was also the administratrix of his estate, that the doctor attended her husband (the alleged inebriate) on two occasions and spent only four or five minutes with him each time. She set forth facts tending to show that he was negligent in making his examination, and that as a consequence her husband's death was due to the lack of proper treatment. A postmortem examination and chemical analysis of the vital organs revealed no alcohol in the body of the decedent, but did show that there was (1) complete coronary occlusion of the descending left branch; (2) terminal dilatation of the heart; (3) chronic fibrous myocardial changes with brown atrophy; (4) acute terminal pulmonary edema; and (5) a small hemorrhage in the right cerebral lobe.

In superior court the lawyer for the defendant physician made a motion to dismiss the case, insisting that the physician had never been engaged or retained by the decedent and that a doctor is not liable for a mistake in diagnosis. The judge allowed the motion upon the assumption that no cause of action was contained in the complaint.

The widow thereupon appealed to the Supreme Court. The appellate court was of the opinion that the physician was not absolved from liability to the patient or to the administratrix of his estate solely because he was not personally engaged and retained by the deceased man. The court stated further that it had been held in other cases that "a physician or surgeon who renders services gratuitously does not effect his duty to exercise reasonable and ordinary care, skill and diligence." The court also held that a doctor is liable for a mistake in diagnosis unless the examination is such as is approved and practiced by medical men of ordinary learning, judgment and skill in that community or similar localities.

The judgment rendered in superior court was set aside, and the case was remanded for new trial.

The point to remember here is that when a physician accepts a case for treatment he is legally required to utilize every resource at his command in arriving at a diagnosis and instituting the proper form of therapy. This rule of law applies in cases where the patient himself engages the services of the doctor, in cases where others do so for him, and in instances where the work is done gratuitously. (Michigan Supreme Court, April, 1947. V. 26 Northwestern Reporter, p. 755.)

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### Final Edition of "Courage and Devotion Beyond the Call of Duty"

The final edition of the book, "Courage and Devotion Beyond the Call of Duty," which is composed of official awards and citations received by U. S. medical officers during World War II, is now being prepared by Mead Johnson & Company, Evansville, Indiana.

Any physician, who has not already done so, should write to Mead Johnson & Co. advising them of the awards he has received and also send a typewritten or photostatic copy of his citations. The following additional information would be of assistance in compiling the material for this book: Present rank or rank at time of discharge. Branch of service. From what university and in what year M.D. degree was received. Date of entry into the service.

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### Winthrop-Stearns, Inc., Formed to Integrate Sterling's Major Pharmaceutical Interests

Formation of Winthrop-Stearns, Inc., as a new subsidiary to integrate the major pharmaceutical interests in the United States of the parent company was announced recently by Sterling Drug Inc., through James Hill, Jr., president. The new company, Mr. Hill said, will conduct the business hitherto carried on by Winthrop Chemical Company, Inc., organized by Sterling in 1919 and now being liquidated, as well as the pharmaceutical operations of the Frederick Stearns & Company Division, Detroit, organized in 1855 as Frederick Stearns & Company.

Dr. Theodore G. Klumpp has been elected president of Winthrop-Stearns Inc.

**Dr. Glenn E. Ullyot** of Philadelphia, head of organic chemical research at Smith, Kline & French Laboratories, pharmaceutical manufacturers in Philadelphia, was elected vice chairman of the Division of Medicinal Chemistry of the American Chemical Society.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

**Vol. XX October, 1947 No. 10**

A WIDE segment of our adult male population had chest X-rays at induction into the Armed Forces. Unsuspected abnormalities of the lungs, mediastinum, thoracic cage and heart were disclosed, many in a presymptomatic stage. The most fruitful result of these surveys, however, has been the discovery of early pulmonary tuberculosis. In this age group, carcinoma of the lung was rarely encountered, but in the present surveys of industrial groups one of the lesions coming to light is asymptomatic circumscribed carcinoma of the lung.

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## CARCINOMA SIMULATING PULMONARY TUBERCULOSIS

The roentgen appearance of a circumscribed pulmonary carcinoma may be simulated by a solitary noncavitary tuberculous focus. In any large series of pneumonectomies for bronchial carcinoma, there will be cases in which lungs containing an isolated, large, tuberculous nodule have been excised. In the two cases reported here, the situation was reversed. These patients were treated for pulmonary tuberculosis for many months before the neoplastic nature of the lesions was recognized.

Case 1: A 61-year-old man had a roentgen film of his chest made in an industrial survey in December, 1943. He was told that he had a tuberculous lesion and was referred to his family physician. After further X-ray study, the physician agreed with this diagnosis. The film showed a faint amorphous density, about 2 cm. in diameter, in the subapical portion of the right upper lobe. The mesial and lower borders of the density appeared somewhat rounded and it faded off laterally into several streaks. A lateral film showed that the lesion was located in the posterior portion of the lobe, a predilection site for early tuberculosis. A chest film made routinely three years previous had disclosed normal lung fields.

He was sent to a tuberculosis institution but no tubercle bacilli could be found in specimens of gastric contents. Since he remained free of symptoms and the lesion appeared unchanged, he was discharged after eight weeks. Four months later, the lesion appeared denser and was 3 cm. in diameter. One month later there was further increase in the size and density of the lesion. The borders were sharper and the diameter measured about 4 cm. Another physician then thought that the patient had a circumscribed pulmonary carcinoma.

On admission to the hospital the patient was found to be well nourished. Physical examination showed no abnormality aside from slight clubbing of the fingers. Tubercle bacilli could not be demonstrated and bronchoscopy did not reveal abnormal findings.

The chest was explored on July 12, 1944. A walnut-shaped mass was palpated in the right upper lobe which was removed, together with the adherent right middle lobe and the regional lymph nodes. On section, the tumor was found sharply circumscribed and proved to be an epidermoid carcinoma. The lymph nodes showed no tumor cells. There was no evidence of a tuberculous lesion. There was no recurrence of the tumor two years after operation.

Circumstances leading to the correct diagnosis in the second case parallel those of the first.

Case 2: A woman of 43 had an industrial chest survey film made in April, 1944. A right upper lobe lesion was found and, after study, the patient was told that she had arrested pulmonary tuberculosis. There were no pulmonary symptoms. The shadow was faint, appeared oval-shaped and measured about 2 cm. in diameter. Its outer border was hazy and several streaks extended from it peripherally. Since tubercle bacilli could not be demonstrated in the body secretions, the patient was allowed to return to work.

Six months later a film revealed a few moth-eaten areas of lesser density within the shadow, but the size was unchanged. Three months later, the shadow was larger and stood out more sharply from the surrounding lung parenchyma. Eight months later the shadow measured 4 cm. in diameter. Her physicians decided that she had active tuberculosis and recommended sanatorium care. She consulted another physician who thought that her film series indicated the presence of a slow-growing circumscribed neoplasm.

On admission to the hospital, the patient had no complaints and physical examination disclosed no abnormalities. No other primary site could be found nor was there any evidence of distant metastatic lesions. A posterior-anterior view of the chest showed a dense oval shadow in the right upper lobe. The lateral chest film showed the lesion to be located in the posterior portion of the upper lobe and sectional radiography disclosed several irregular areas of decreased density within it.

The first attempt to explore the chest was abandoned because the patient went into severe shock. At the second operation two weeks later a partial lobectomy of the portion of the lobe containing the tumor was performed. No involvement of the lymph nodes, pleura or chest wall was noted.

Grossly, the specimen showed a well circumscribed oval neoplasm; in its center were several small areas of necrosis; it was an adenocarcinoma. A small bronchopulmonary lymph node showed no tumor cells. No tuberculous lesions could be found.

These two cases point up some of the difficulties in differentiating a slow-growing circumscribed neoplasm of the lung and a solitary tuberculous focus, particularly when the lesion is situated in the upper lobes. A proper evaluation of the alterations in the appearance of the lesion on successive films was crucial in both these cases, since neither of the patients had any symptoms. Circumscribed bronchial carcinoma may be silent for a prolonged period and, in this respect, behaves like many cases of early pulmonary tuberculosis.

At the present time, physicians are aware that pulmonary tuberculosis produces few symptoms and signs at its onset and that the diagnosis must be made in this stage if the chances of recovery are to be maximum. This is no less true of the circumscribed varieties of bronchial carcinoma. Mass surveys and routine chest roentgenography are becoming the important methods by which operable pulmonary cancers are discovered. The two cases reported here were mistaken for pulmonary tuberculosis for seven and sixteen months, respectively, before they were admitted to a hospital for surgery.

**Carcinoma Simulating Pulmonary Tuberculosis, Louis E. Siltzbach, M.D., The American Review of Tuberculosis, Feburary, 1947.**

# BULLETIN BOARD

## MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

### Minutes of Meeting of Certain Committees with the Executive Committee September 7

A number of the committees of the Medical Society of the State of North Carolina met in joint session with the Society's Executive Committee on Sunday morning, September 7, at Sedgefield Inn, near Greensboro. The meeting was called to order at 11:30 a.m. by President Sharpe, who presided.

The following members were present:

**Officers:**

Dr. Frank A. Sharpe, president, Greensboro.
Dr. J. F. Robertson, president-elect, Wilmington.
Dr. V. K. Hart, first vice president, Charlotte.
Dr. J. G. Raby, second vice president, Tarboro.
Dr. Roscoe D. McMillan, secretary-treasurer, Red Springs.

**Councilors:**

Third District—Dr. Donald B. Koonce, Wilmington
Fifth District—Dr. John N. Robertson, Fayetteville
Seventh District—Dr. Elias S. Faison, Charlotte
Eighth District—Dr. James H. McNeill, North Wilkesboro
Ninth District—Dr. Irving E. Shafer, Salisbury
Tenth District—Dr. D. M. McIntosh, Sr., Old Fort

**Committee Chairmen and Members:**

Dr. V. M. Hicks, Raleigh
Dr. Wingate M. Johnson, Winston-Salem
Dr. G. Westbrook Murphy, Asheville
Dr. R. B. Davis, Greensboro
Dr. Frank C. Smith, Charlotte
Dr. Rowland T. Bellows, Charlotte
Dr. Verne S. Caviness, Raleigh
Dr. Harry Winkler, Charlotte
Dr. Hugh A. Thompson, Raleigh

**Others:**

Mr. J. T. Barnes, executive secretary, Raleigh
George Pennell, Esq., attorney at law, Asheville

President Sharpe introduced Mr. J. T. Barnes, the new executive secretary, and then called on Dr. Hart to outline the progress of his committee, which was to study the matter of hospital, medical, and surgical insurance, and make recommendations. Dr. Hart reported that the members of the committee were at work preparing tentative fee schedules and that the first called meeting of the committee would be held on November 1 and 2. The matter of adding to the committee representatives for the fields of dermatology and diseases of the chest was discussed, and the decision was left to Dr. Hart .

Dr. Koonce, chairman of the Public Relations Committee, outlined his committee's plan of procedure as follows:

1. To handle all publicity through the executive secretary, Mr. Barnes.
2. To create an annual scholarship competition for high-school students, with a scholarship not to exceed $600 to be awarded to the student who presents during the year the best paper or declamation on the relations between the medical profession and the public.
3. To present a plaque or some other award to the county medical society which contributes most toward good public relations during the year. County medical societies would be encouraged to sponsor addresses by medical men to civic and religious clubs and groups, and to appoint a local committee to control the local press notices—to stress the favorable ones and to try to subdue as much as possible the unfavorable ones.
4. Possibly to have an article on public relations written for the **North Carolina Medical Journal** each month by a well-known layman or doctor.

Dr. Koonce requested the Executive Committee's approval of the second and third items listed above. After some discussion, Dr. Shafer moved that this approval be granted. Dr. McNeill seconded the motion, and it was passed unanimously.

Dr. Robertson, chairman of a committee appointed to visit Dr. Graham and discuss with him the matter of selection of the faculty for the four-year medical school of the University of North Carolina, reported that the committee met with President Graham at his home about two months ago, and that they found him most cooperative and appreciative of the Society's interest. He asked for definite instructions as to the committee's next move. Dr. Koonce moved that the committee be instructed to ask President Graham's permission to have committees representing the different specialties confer with him upon the selection of professors for the four-year medical school. The motion was seconded by Dr. Shafer and, following some discussion, was carried.

Secretary McMillan stated that Dr. J. Gaddy Matheson, councilor of the First District, had resigned, and had recommended that Dr. Zack D. Owens, of Elizabeth City, be appointed to fill out his unexpired term. Upon motion, duly seconded and carried, the appointment of Dr. Owens was confirmed.

The secretary then read a letter from Mr. Lee L. Gravely, chairman of the board of directors of the North Carolina Sanatorium for Tuberculosis, in regard to the location of additional beds for tuberculosis patients. Dr. Shafer moved that Dr. W. M. Coppridge be appointed to confer with the board of directors about the matter. The motion was seconded by Dr. Robertson and carried unanimously.

Secretary McMillan then discussed plans for the 1948 meeting of the State Society, which is to be held in Pinehurst May 3, 4, and 5.

Dr. V. M. Hicks, chairman of the finance committee, read the following report regarding the salary and duties of Mr. J. T. Barnes, the executive secretary:

"The committee charged with the employment of an executive secretary completed its work by employing Mr. J. T. Barnes at an annual salary of $5,400.

"A special committee composed of the following: (1) Dr. Frank A. Sharpe, president, chairman; (2) Dr. Roscoe D. McMillan, secretary-treasurer; (3) Dr. V. M. Hicks, chairman of the Finance Committee; and (4) Dr. Wm. M. Coppridge, past president, was charged with the duty of defining the work of the executive secretary and recommnding to the Executive Committee the amount or rate to be paid him for travel and other expenses.

"We wish to submit the following recommendations:

"1. That the first few months of his employment be devoted to acquiring all knowledge possible of our organization, both in the secretary's office and by contacts with the present officers of the Society. We feel that it is necessary for him, as rapidly as possible, to meet with all committees of the Society, all district societies, and as many county societies as possible.

"2. It will be desirable for him to visit other state society executive offices, such as those in West Virginia and Connecticut, or others that have outstanding organizations. A visit to the offices of the American Medical Association would be desirable.

"3. He shall become familiar with the workings of the State Board of Medical Examiners, State Board of Nurse Examiners, State Hospital Association, the **North Carolina Medical Journal**, the State Board of Health, and other organizations with which our Society has common interest.

"4. The executive secretary shall work out of the present office of the secretary-treasurer, under the direction of the present secretary-treasurer together with the president and the president-elect. This will not necessitate his residence at any special place.

"5. We recommend that expenses incurred in travel other than by automobile be paid to the executive secretary on the basis of actual expense incurred and that he submit to the secretary-treasurer, the president, and the president-elect a statement on the first of each month of such expenses. For automobile travel (with the executive secretary furnishing and maintaining his own car) he shall be paid at the rate of—(to be determined later). The matter of length of vacation, hours of work, or other details of his duties will be decided by the above-named committee—the president, the president-elect, and the secretary-treasurer."

A motion to adopt the report was seconded and carried.

Dr. G. Westbrook Murphy, chairman of the Special Committee on the Workmen's Compensation Act, reported on the progress that had been made by the committee since the House of Delegates voted at Virginia Beach to withdraw the Medical Advisory Committee to the Industrial Commission, withhold all official approval of the methods of administration of the Workmen's Compensation Act, and appropriate sufficient funds (subject to the approval of the Executive Committee) to take to the courts the question of the administration of the Workmen's Compensation Act. He stated that the committee appointed by Dr. Sharpe (Dr. R. B. Davis of Greensboro, Dr. Frank C. Smith of Charlotte, Dr. Hugh A. Thompson of Raleigh, Dr. Rowland T. Bellows of Charlotte, Dr. M. H. Greenhill of Durham, Dr. A. C. Ambler of Asheville, Dr. Verne S. Caviness of Raleigh, Dr. T. R. Huffines of Asheville, Dr. Harry Winkler of Charlotte, and Dr. G. W. Murphy of Asheville, chairman) recommends that the Executive Committee authorize the taking of the matter to the courts of North Carolina for settlement. Mr. George Pennell of Asheville, the lawyer whom the committee had consulted, was present and was given the courtesy of the floor. He stated that the best plan of procedure would be to bring several cases to court to test the validity of different points of the law. If a case is carried to the Supreme Court, the question will be decided, once and for all. If the law is found to be utterly and inherently wrong, it would be necessary to have it amended or repealed by the General Assembly of North Carolina. He brought out the fact that the Insurance Commissioner's report shows that $4,000,000 in profits is paid annually to the industrial insurance companies in North Carolina.

In the discussion which followed, Dr. R. B. Davis quoted Mr. Pennell as saying that about forty states have an industrial insurance law, and that about eight have tested it. In six cases out of the eight the Supreme Court's ruling was in favor of the medical society.

Following a lengthy discussion, Dr. Faison moved the adoption of the following resolution: "RESOLVED, that the Executive Committee of the Medical Society of the State of North Carolina endorse the proposal made by the Special Committee on the Workmen's Compensation Act and that the said committee be authorized and empowered to proceed with the plan as outlined here; and BE IT FURTHER RESOLVED that the Executive Committee authorize the expenditure, for such purpose, of funds not to exceed $1,500."

The motion was seconded by Dr. McNeill and carried unanimously.

The meeting then adjourned at 4 p.m., and the Executive Committee went into executive session.

### Executive Session

President Sharpe called the meeting to order and asked Secretary McMillan to state the business at hand.

Secretary McMillan requested authorization from the Executive Committee to add to the budget the expenditures entailed by the actions of the preceding meeting—the salary and traveling expenses of the executive secretary, the $600 for the scholarship authorized to be established by the Committee on Public Relations, and the $1,500 for the Committee on the Workmen's Compensation Act. Vice-President Hart offered the following motion:

"BE IT RESOLVED that the Executive Committee of the Medical Society of the State of North Carolina authorize the following additional expenditures, over and above the budget adopted at the annual meeting of the Society at Virginia Beach in May, 1947: (1) $1,500 for the use of the Committee on the Workmen's Compensation Act; (2) $600 for the scholarship to be established by the Committee on Public Relations and the plaque to be awarded by that committee to the county medical society doing the best work in public relations; (3) $5,400 for the salary of the executive secretary of the Society, plus reimbursement for his expenses as recommended by the committee on the establishment of an executive secretary.

The motion was seconded and carried unanimously, and the Executive Committee adjourned at 4:20 p.m.

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## REGIONAL MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS

The North Carolina Regional Meeting of the American College of Physicians will be held at Chapel Hill on November 14, 1947, with the University of North Carolina as hosts. The program for the afternoon session, which will begin at 2 p.m., is as follows:

"The Shoulder Hand Syndrome"—Elbert L. Persons, M.D., Duke University School of Medicine

"Tropical and Parasitic Infestations in Veterans and Civilians in North Carolina"—Thomas T. Mackie, M.D., Bowman Gray School of Medicine of Wake Forest College

Clinicopathologic Conference — J. M. Brinkhous, M.D., University of North Carolina School of Medicine, and David Caver, M.D., Bowman Gray School of Medicine of Wake Forest College

"Effect of Lanatoside C on the Circulation of Patients with Congestive Heart Failure. A Study Using the Technique of Right Heart Catheterization"—Eugene A. Stead, Jr., M.D., Duke University School of Medicine

"Recent Advancement in the Treatment of Pulmonary Tuberculosis"—H. Stuart Willis, M.D., Sanatorium

Dr. Hugh J. Morgan, president of the American College of Physicians and dean of the Vanderbilt University School of Medicine, will address the evening meeting.

Through Dr. Robert L. McMillan, program chairman, and Dr. Paul F. Whitaker, district governor of the American College of Physicians, a most cordial invitation is issued to any practicing physician or surgeon, intern or medical student to attend the scientific session in the afternoon.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF MEDICINE

The following new staff members have been added to the medical faculty:

Dr. H. D. Bruner, formerly assistant professor of pharmacology at the University of Pennsylvania School of Medicine, as professor and head of the Department of Pharmacology. Dr. Bruner received his M.D. degree from the University of Louisville and his Ph.D. in physiology from the University of Chicago. During the war he was a member of a research team on a war gas project at the Harrison Research Surgical Laboratory of the University of Pennsylvania.

Dr. C. T. Kaylor, formerly professor of anatomy at Syracuse University School of Medicine, as associate professor of anatomy.

Dr. DeArmond Moore as instructor in anatomy. Dr. Moore is a native of Charlotte, graduated from the Medical College of Virginia, and recently completed an assistant residency in surgery at the Hospital of the Medical College of Virginia.

Dr. Margaret Swanton as fellow in pathology. Dr. Swanton, an alumna of the Medical School, graduated at Johns Hopkins University School of Medicine in 1946 and interned at the State University of Iowa.

Mr. M. K. Berkut as instructor in biological chemistry and nutrition. He comes to us from the department of chemistry at North Carolina State College.

The following promotions are announced, effective September 1:

Dr. A. V. Jensen from assistant to associate professor of anatomy.

Dr. Fred L. Rights from assistant to associate professor of bacteriology.

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The North Carolina Division of the American Cancer Society has approved a grant-in-aid of $1500 to the Medical School for assistance in securing speakers on cancer for postgraduate program to be resumed in the winter and spring of 1948.

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Drs. Wm. deB. MacNider, E. M. Hedgpeth, and W. R. Berryhill addressed the September meeting of the Johnston County Medical Society at Micro, North Carolina.

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Dr. A. H. London, president of the University Medical Alumni Association, has appointed the following men as an alumni visiting committee representing all sections of the state to work with the Medical School administration and the Alumni Association in the important planning for the Medical School expansion:

Dr. Henry Temple, Kinston
Dr. A. Bryon Holmes, Fairmont
Dr. Claiborne Smith, Rocky Mount
Dr. Roy McKnight, Charlotte
Dr. Fred Hubbard, North Wilkesboro
Dr. Whitehead McKenzie, Salisbury
Dr. Julian Moore, Asheville
Dr. Zack Owens, Elizabeth City
Dr. Vonnie Hicks, Raleigh
Dr. Ben Royal, Morehead City
Dr. Verne Blackwelder, Lenoir

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Grants-in-aid from the Fels Fund and the Alamance County General Hospital Fund which have been awarded previously to the Department of Biological Chemistry and Nutrition are being continued during the current academic year.

A grant-in-aid of $3400 has been made to the Department of Pathology by the U. S. Public Health Service to develop a visual education program in the general pathology of neoplasms. This grant was made on the advice of the National Advisory Cancer Council and the North Carolina State Board of Health.

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Two staff members of the School of Medicine were guests of the Hematology Study Section of the U. S. Public Health Service at a symposium on blood coagulation in Washington, D. C., September 26 and 27. Dr. John H. Ferguson served as chairman of the section on Clotting Factors, and Dr. K. M. Brinkhous served as chairman of the Section on Platelets and Hemophilia.

## NEWS NOTES FROM THE BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

On September 19, 1947, formal dedication exercises were held at Graylyn, the Bowman Gray estate in Winston-Salem which has been given to the medical school for use as a rehabilitation and convalescent center. Guest speakers for the occasion were Dr. Arthur H. Ruggles, superintendent of Butler Hospital at Providence, Rhode Island, and organizer of the Department of Psychiatry at Yale University; and Dr. C. C. Burlingame, psychiatrist in chief of the Institute of Living in Hartford, Connecticut and a member of the visiting staff of the College of Physicians and Surgeons in New York.

The principal speaker at the banquet, held at 6:30 p.m. on the same date, was Dr. Winfred Overholser, superintendent of St. Elizabeth's Hospital in Washington, D. C. who is president of the American Psychiatric Association and professor of psychiatry at George Washington School of Medicine.

The convalescent center is being operated by the Department of Neuropsychiatry of the Bowman Gray School of Medicine of Wake Forest College. Dr. Lloyd J. Thompson, professor of neuropsychiatry, is chief of service; and Dr. Douglas M. Kelley, associate professor of neuropsychiatry, is medical director at Graylyn.

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Dr. Wingate M. Johnson, professor of clinical medicine, has recently been elected to the Board of Trustees of the American Medical Association. He was elected to fill the unexpired term of Dr. Charles W. Roberts, of Atlanta, Georgia, who died in July. Dr. Johnson's book **The Years After Fifty** has recently been published and has won wide acclaim.

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Dr. Weston M. Kelsey was recently promoted to the position of assistant professor of pediatrics. Dr. Kelsey joined the staff of the Bowman Gray School of Medicine on January 1, 1946, as instructor in pediatrics. He received the degree of Doctor of Medicine from Johns Hopkins University and practiced pediatrics in Westport, Connecticut, prior to entering the Army. He received his discharge in October, 1945, after serving as flight surgeon in the Pacific Theater for three years.

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Announcement of the appointment of Dr. Raymond W. Postlethwait as instructor in surgery was made recently. Dr. Postlethwait, who is a native of New Martinsville, West Virginia, will take up his duties at the medical school on January 1, 1948. He received his education at West Virginia University and Duke University School of Medicine.

Dr. Frank R. Lock, director of the Department of Obstetrics and Gynecology, was chosen as one of the seven specialists throughout the country to be guest speaker at the first annual Postgraduate Assembly of the San Diego County General Hospital in San Diego, California, October 6, 7 and 8. During his stay in California, he also addressed the Regional Obstetrical and Gynecological Society on the subject of "Early Diagnosis and Management of Cervical Cancer."

## News Notes from the North Carolina Tuberculosis Association

Mrs. P. P. McCain of Southern Pines and Charles A. Cannon of Concord have been appointed by Governor Cherry to the Board of Directors of the North Carolina Sanatorium. Members who were reappointed to the Board are L. Lee Gravely of Rocky Mount, chairman; Carl Council of Durham; and E. A. Raspberry of Snow Hill.

* * * *

The executive committee of the National Conference of Tuberculosis Secretaries has appointed Mrs. C. O. DeLaney, Winston-Salem, chairman of its Advisory Committee on Rehabilitation.

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The tuberculosis death rate for the United States as a whole showed a drop of 4.2 per 100,000 population in 1946, according to provisional figures issued recently by the Statistical Service of the National Tuberculosis Association.

The 1946 provisional death rate, arrived at through figures supplied by state health departments, is 35.9 per 100,000 as compared with the final figure of 40.1 per 100,000 in 1945. The provisional death rate for North Carolina for the year 1946 is 28.9 as compared with the figure of 31.6 for 1945.

According to the Statistical Service, the sharp drop from 1945 to 1946 is partly due to the fact that 7,566,993 members of the armed forces stationed overseas in 1945 were excluded from the population estimate which served as the base for computing the mortality rate for that year. All but 1,335,287 of these servicemen and women had returned to continental United States by July 1946 and consequently are included in the 1946 population estimate for the country as a whole.

## The Duke Symposium

The tenth annual Medical Symposium sponsored by the Duke University School of Medicine and Duke Hospital was held at Duke on October 17 and 18. The subject of the symposium was "Diseases of the Gastro-Intestinal Tract," and the speakers included Dr. Frank C. Mann and Dr. J. Arnold Bargen of Rochester, Minnesota, Dr. Walter L. Palmer of Chicago, Dr. Leon J. Saul of Philadelphia, Dr. Owen H. Wangensteen of Minneapolis, Dr. Henry W. Cave and Dr. Stewart Wolf of New York, Dr. Richard Schatzki of Cambridge, Massachusetts, and Dr. Richard Sweet of Boston.

## North Carolina Urological Association

The seventeenth annual meeting of the North Carolina Urological Association was held at Sedgefield Inn on October 5 and 6. Guest speakers were Dr. Robert B. McIver of Jacksonville, Florida, and Dr. Herbert M. Levitt of Columbia, South Carolina. Other speakers were Drs. Robert McKay, Kenneth M. Lynch, Jr., and Aubrey Hawes of Charlotte, Dr. Fred K. Garvey of Winston-Salem, Dr. John Rhodes of Raleigh, and Dr. William M. Coppridge of Durham. Dr. John Frazier of Salisbury is president of the organization.

## Edgecombe-Nash Counties Medical Society

The Edgecombe-Nash Counties Medical Society met in Rocky Mount on September 10 to hear the report of the Blood Bank Committee and to discuss phases of the organization and maintenance of a blood bank.

## Halifax County Medical Society

The regular monthly dinner and meeting of the Halifax County Medical Society was held in Roanoke Rapids on September 12. Dr. Herman F. Easom, superintendent of the Eastern North Carolina Sanatorium at Wilson, spoke on "Recent Advances in the Treatment of Tuberculosis."

## News Notes

Dr. William Seaman Bainbridge of New York, one of the seven honorary members of the Medical Society of the State of North Carolina, died on September 22.

* * * *

The following North Carolina surgeons were accepted into fellowship at the thirty-third convocation of the American College of Surgeons, held in New York on September 12:

| | |
|---|---|
| Cecil C. Belcher | Asheville |
| Verne H. Blackwelder | Lenoir |
| George F. Busby | Salisbury |
| Dennis B. Fox | Albemarle |
| H. Fleming Fuller | Kinston |
| Charles A. Glenn | Gastonia |
| William F. Hollister | Pinehurst |
| George W. Paschal, Jr. | Raleigh |
| F. M. Simmons Patterson | Laurinburg |
| Edward W. Phifer | Morganton |
| Warner Lee Wells | Raleigh |

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Dr. J. B. Anderson has announced the reopening of his office in Asheville for the practice of general surgery.

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Dr. Joseph J. Combs of Raleigh has been appointed State College physician, succeeding Dr. A. C. Campbell, who died in June. Dr. Combs will work at the institution on a part-time basis and will maintain his practice in Raleigh.

* * * *

Dr. Charles Welfare has announced the opening of offices for the practice of internal medicine in Winston-Salem.

## Corrections for the Roster

The following additional corrections have been received for the roster and alphabetical list of fellows published in the August issue. Any other corrections should be sent to Dr. Roscoe D. McMillan, Red Springs, at once.

Dr. Joseph C. Knox, Wilmington—Specialty should be Pd rather than PH

Dr. R. K. Adams, Morganton—Specialty should be PN rather than P

Dr. Clifton F. West, Kinston—Specialty should be I rather than GP

## NORTH CAROLINA STATE NURSE'S ASSOCIATION

The forty-fifth annual convention of the North Carolina State Nurse's Association and the twenty-ninth annual meeting of the North Carolina League of Nursing Education was held in Asheville on October 15. The convention was preceded by an institute for private duty nurses and a workshop on supervision for public health nursing supervisors on October 13 and 14. Among the speakers at the convention was Dr. H. Stuart Willis, superintendent of the North Carolina sanatoria.

## CANCER SEMINAR

An educational seminar covering the entire field of malignant diseases will be held November 12, 13 and 14, 1947, in the auditorium of the Roosevelt Hotel, Jacksonville, Florida. This seminar is under the auspices of the American Cancer Society, Florida Division, and is being staged by the Tumor Clinic of the Duval County Hospital, Jacksonville, Florida.

The prime purpose of this meeting is to make available to the physicians of the Southeast the latest knowledge in the diagnosis and management of malignant diseases. The American Cancer Society has devoted considerable effort to lay education, and it is hoped that this seminar will provide the counterpart within the medical profession by bringing the most recent information to the physicians so that they may keep abreast of developments in the various fields of malignant diseases. This is the first meeting of this nature to be held in this part of the country, and an open invitation is extended to all physicians who find it possible to attend.

The final roster of speakers is as follows:

1. Dr. Emil Novak, Department of Gynecology, Johns Hopkins Hospital, Baltimore
   Tumors of the Female Genital Tract
2. Dr. Samuel Marshall, Department of Surgery, Lahey Clinic, Boston
   Tumors of the Gastrointestinal Tract
3. Dr. Archie Dean, Chief, Urological Service, Memorial Hospital for the Treatment of Cancer, New York City
   Tumors of the Genito-Urinary Tract
4. Dr. Everett Sugarbaker, Sugarbaker Clinic, Jefferson City, Missouri
   Tumors of the Breast and Lymphomas
5. Dr. George T. Pack, Attending Surgeon in Charge of Mixed Tumor Service, Memorial Hospital for the Treatment of Cancer, New York City
   Mixed Tumors
6. Dr. James Elliott Scarborough, Director, Winship Clinic for Cancer, Emory University Hospital, Atlanta—Tumors of the Head and Neck
7. Dr. Herbert Adams, Department of Surgery, Lahey Clinic, Boston—Tumors of the Chest
8. Dr. R. R. Spencer, Cancer Research Director, National Cancer Institute, Bethesda, Maryland
9. Dr. Everett L. Bishop, Tumor Pathology, Chief Pathologist, Winship Clinic for Cancer, Department of Pathology, Emory University, Atlanta

There will be no registration fee required, all necessary funds being supplied by the American Cancer Society, Florida Division, and the Florida State Board of Health. In the matter of reservations, local hotels will give preference to doctors attending the seminar. Details of the date and time of the various lectures may be obtained from the president of your local medical society.

## MEDICAL SOCIETY OF VIRGINIA

The Medical Society of Virginia held its centennial meeting in Roanoke on October 13, 14, and 15. Officers of the society are Dr. W. L. Powell of Roanoke, president; Dr. Guy R. Fisher of Staunton, president-elect; Drs. A. B. Hodges of Norfolk, Carrington Williams of Richmond, and W. C. Akers of Stuart, vice presidents; and Miss Agnes V. Edwards of Richmond, executive secretary-treasurer.

## AMERICAN ACADEMY OF ALLERGY

The American Academy of Allergy will hold its annual convention at Hotel Jefferson, St. Louis, Missouri, December 15-17 inclusive. All physicians interested in allergic problems are cordially invited to attend the sessions as guests of the Academy by registering without payment of fee. The program, the scientific, and technical exhibits have been arranged to cover a wide variety of conditions where allergic factors may be important. Papers will be presented dealing with the latest methods of diagnosis and treatment as well as the results of investigations and research. Round-table conferences will be held on Monday afternoon, December 15, 1947. Advance copies of the program may be obtained by writing to the Chairman on Arrangements, Charles H. Eyermann, M.D., 634 North Grand Boulevard, St. Louis, Missouri.

## AMERICAN HEART ASSOCIATION

The appointment of Dr. Charles A. R. Connor as medical director of the American Heart Association was announced recently by Dr. Arlie R. Barnes, president of the association.

Dr. Connor succeeds Dr. David D. Rutstein, who recently resigned to take the post of professor of preventive medicine at the Harvard Medical School.

## PAN AMERICAN MEDICAL WOMEN'S ALLIANCE

The first Congress of the Pan American Medical Women's Alliance will be held November 17-20 in Mexico City. Women physicians of the Latin American Republics and the United States are cordially invited to attend. Requests for reservations should be addressed to Dr. Guadalupe Alvarez de Acosta, Calz de Piedad No. 47, Mexico, D.F.

## NATIONAL HEARING WEEK

With three million children in the United States having a hearing loss, and millions of adults already hard of hearing, it is time to conserve hearing, according to Dr. C. Stewart Nash, President of the American Hearing Society, Washington, D. C. The national organization is joined by its 120 local chapters throughout the country in the observance of NATIONAL HEARING WEEK, November 9-15.

"Authorities estimate that one out of every ten persons in America has a hearing loss, ranging from a slight loss to almost total deafness. The social and mental effects of this hearing loss can do much to warp the personality of a growing child, and in addition may prove an effective bar to the child's making a success of later life," said Dr. Nash.

Dr. Nash recommended a vigorous hearing conservation program to be put in effect in the school system of the nation. This includes periodic hearing tests, medical examinations followed by prompt medical attention if any impairment is discovered, and adequate education and rehabilitation for those with a handicapping hearing loss.

### SCHOLAR IN MEDICAL SCIENCE PROGRAM ANNOUNCED BY MARKLE FOUNDATION

An opportunity to start a career in academic medicine is offered to young scientists with the necessary training to hold a regular faculty appointment and to conduct original research through a new program of "post-fellowship" grants, announced by the John and Mary R. Markle Foundation. The purpose of the program, according to John M. Russell, Executive Director of the Foundation, is to attract much-needed talent to academic medicine by giving promising young scientists academic security and financial assistance for a period up to five years. The program will be conducted in cooperation with accredited medical schools in the United States and Canada. Grants of $25,000, payable to the cooperating school at the rate of $5,000 annually for a five-year period toward the support of each successful candidate or his research or both, will be available beginning with the academic year 1948-49. If the plan proves successful, the Foundation will appropriate a total of $1,250,000 to the schools by 1953.

Candidates will be recommended by medical schools and will be limited to young men and women with a particularly strong interest in research and teaching in any of the clinical or pre-clinical sciences or in the sciences basic to medicine. They will have had training in some special field or combination of fields to qualify them to receive a regular faculty appointment and to conduct original research. The final choice will be made, on the basis of the schools' recommendations, by regional committees appointed by the Foundation. The young scientists chosen will be known as "Scholars in Medical Science." No fixed number of Scholars will be appointed in any year, but it is expected that approximately fifty will receive appointments during the five-year period. For each Scholar, the school will determine salary and academic rank, encourage research by setting reasonable limits upon teaching and other non-research activities, provide laboratory facilities, and, if necessary, make a financial contribution toward the support of his work.

The Scholar program is the result of a survey of medical research and education, recently made by the Foundation, which shows that while there are scholarships and other forms of financial aid for the student in the course of his scientific training and while there are funds available to the scientist once his name is made, there are few sources of help at the beginning of the career of the man who chooses academic medicine.

A pamphlet covering the details of the plan has been sent to all deans of accredited medical schools, and persons interested in being considered as candidates are referred to them for further information.

WANTED—INDUSTRIAL PHYSICIAN

Large company. Established Medical Department. 40 hour week. Salary open. Age: up to 40 years.

P. O. BOX 2871,
Winston-Salem, N. C.

(BULLETIN BOARD CONTINUED ON PAGE 686)

# AUXILIARY

## A MESSAGE FROM THE PRESIDENT

Dear Auxiliary Members:

This year the Auxiliary is planning for its twenty-fifth anniversary. We were organized in 1923 in Asheville, with our beloved Sadie McCain our first president. It is good to look back over these years and remember the fine past presidents, to consider the friendships that our association together has brought, and the service we have been able to render. These have been anxious years and confusing years, for they have seen two depressions, a war, and now an inflation.

Let us in this our twenty-fourth year, facing our twenty-fifth anniversary, take account of ourselves as an organization and renew our purposes and aims. Let us view each proposed activity to determine if it comes within the realm of our reason for being.

The purposes of our organization are, first, to interpret the aims of the medical profession to other organizations interested in the promotion of health education; second, to promote friendliness among the families of the medical profession; and third, to do such work as may be approved from time to time by the Advisory Committee appointed by the Medical Society.

Our long-range project is the maintenance of the McCain, Stevens, and Cooper Sanatoria Beds, and the establishment of a Student Loan Fund. Watch this page for a detailed account of these activities at a later date.

This year Dr. Frank Sharpe, president of the Medical Society of the State of North Carolina, has asked the Auxiliary to cooperate with other interested agencies in the campaign for student nurse recruitment. As part of this campaign Miss Alice Geraldine Maxwell (who is "Miss North Carolina Student Nurse for 1947") is being taken on a speaking tour by the North Carolina State Nurses Association to nine of the largest cities in the state. The auxiliaries in these nine cities are asked to have a tea for Miss Maxwell and Miss Miles, the councilor for the Nurses Association who will be traveling with her, and to invite the superintendents of nurses of the local hospitals and all the young women in the community who may be interested in entering nurse's training. You will be interested in the schedule of Miss Maxwell's tour. It is as follows:

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|---|---|
| Fayetteville | Monday, October 20 |
| Wilmington | Tuesday, October 21 |
| Wilson | Thursday, October 23 |
| Raleigh | Friday, October 24 |
| Durham | Monday, October 27 |
| Greensboro | Tuesday, October 28 |
| Winston-Salem | Wednesday, October 29 |
| Asheville | Friday, October 31 |
| Charlotte | Monday, November 3 |

The fall Board Meeting was held September 30 in Southern Pines at the home of Mrs. P. P. McCain. At that time the Executive Board met with the committee chairmen, the councilors, and the presidents of the county auxiliaries to discuss the year's work. The honor guests for this occasion were Dr. and Mrs. Frank Sharpe and Dr. and Mrs. Roscoe McMillan.

May our 1947-1948 year be a profitable one, and may we enter our twenty-fifth anniversary year with clear vision and renewed dedication to the profession we cherish.

Sincerely yours,

MRS. W. REECE BERRYHILL,
*President*

# BOOK REVIEWS

**Skin Manifestations of Internal Disorders.** By Kurt Wiener, M.D., Dermatologist, Mount Sinai Hospital, Deaconess Hospital, Saint Michael's Hospital, Milwaukee, Wisconsin. 690 pages. Price, $12.50. St. Louis: The C. V. Mosby Company, 1947.

The author attempts a systematic presentation of the skin manifestations of internal disorders. His purpose is to strengthen the idea that the patient must be studied as a whole and that skin manifestations of disease should not be considered as lying solely within the province of the dermatologist. Relatively minor changes in the skin may serve as the clue to diagnosis of an obscure systemic disease.

The material presented is organized by types of diseases. This organization makes it necessary to have some hint as to the diagnosis before the book can be used for confirmation of the diagnosis; it would be difficult to work back from the skin manifestation toward the diagnosis.

The volume is profusely illustrated, though the quality of the photographs is highly variable. There are six plates in color. An extensive bibliography is conveniently located at the bottom of each page.

The book serves to emphasize the fact that many physiologic processes in most diseases have some external manifestation; for these manifestations the author has coined the term "dermadrome."

**The Years After Fifty.** By Wingate Johnson, M.D. 153 pages. Price, $2.00. New York: The Whittlesey House, 1947.

At last we have a book that can be recommended with confidence to the older patient. Succeeding where other eminent men have failed, Dr. Johnson has really written for the patient. The language is simple; medical terms, when used, are carefully explained; and the style is a pleasure to read.

The author performs admirably the task of quieting the fears of disease responsible for so much mental misery. On the other hand, he meticulously stresses the gravity of certain conditions without giving the patient morbid ideas of hopelessness. Along with the "thou shalt not" advice inevitable in a book of this type, the author wisely takes up the wide varieties of enticing possibilities which remain open for the older patient.

The descriptions of diseases are concise and brought down to the layman's level of understanding. The types and possibilities of therapy are mentioned in generalities. The book is written in such a manner that it could not be used as a "home guide to diagnosis and treatment." On the contrary, regular and prompt visits to the physician are repeatedly advised.

Along with the physical aspects of aging, the author emphasizes the important mental changes which can make "the years after fifty" a burden or a period of unequalled contentment and a source of inspiration to others. Here he convincingly points out the rewards one receives when the physical attractiveness and prowess of youth are lost. Almost imperceptibly woven into this work is the pointing out of a way of life which makes growing older one of the true pleasures of living.

The book is short (144 reading pages)—an important attribute in a medical work for the laity. Its clear type and dull-finished pages simplify its reading. There are appended an index and a well-selected bibliography which includes recommended books for the physician and layman who wish to delve deeper into the subject.

Upon completion of this book one cannot help feeling grateful to the author for pouring out so generously his own philosophy of life.

**Microbial Antagonisms and Antibiotic Substances.** By Selman A. Waksman, M.D., Professor of Microbiology, Rutgers University; Microbiologist, New Jersey Agricultural Experiment Station. Ed. 2. 415 pages. Price, $4.00. New York: The Commonwealth Fund, 1947.

The extremely rapid clinical application of antibiotics is one of the miracles of modern medicine. This tremendous new field offers such promise that physicians should be familiar with the fundamental biologic basis for the use of antibiotics. This volume discusses the known facts on antibiotics from the point of view of the fundamental bacteriologic principles involved. The importance of the micro-organisms found in soil is not appreciated by practicing physicians. The author traces the reasoning behind the discovery of antibiotics and their importance not only in the control of human disease but in the control of plant diseases and in the normal growth of plants.

The chemical and biologic properties of the various antibiotics are discussed, and the toxic properties listed. The known antibiotics are listed—and there are an imposing number.

A glossary and an extensive bibliography are appended.

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**Signs and Symptoms: Their Clinical Interpretation.** Edited by Cyril Mitchell MacBryde, M.D., F.A.C.P., Assistant Professor of Clinical Medicine, Washington University School of Medicine; Assistant Physician, Barnes Hospital, St. Louis, Missouri. 439 pages. Price, $12.50. Philadelphia: J. B. Lippincott Co., 1947.

This work is an enlargement of **The Analysis and Interpretation of Symptoms**, which, in turn, was reprinted from **Clinics** for April, 1944. The original volume contained only ten articles; the present one, twenty-seven, by twenty-one different authors. It covers most of the signs and symptoms commonly encountered in practice. After an introductory chapter by Dr. MacBryde on analyzing and interpreting symptoms, the following subjects are discussed in order: pain, headache, sore tongue and sore mouth, thoracic pain, abdominal pain, backache and back pain, joint pain, pain in the extremities, disturbances of consciousness and of muscle movement, fainting, dyspnea, cyanosis, dehydration, edema, palpitation and tachycardia, cough, hemoptysis, obesity, weight loss and undernutrition, anorexia, nausea and vomiting, constipation and diarrhea, hematemesis and melena, jaundice, itching, and nervousness and fatigue.

The high professional reputation of the authors of these articles assures their soundness. It will be gratifying to North Carolinians to know that one of the best discussions, that on fainting, was contributed by Dr. Eugene Stead, Jr., who succeeded Dr. Fred Hanes as professor of medicine at Duke. Most of the articles are quite easy to read, as well as informative. The illustrations are well chosen and helpful.

No doubt many veterans will be glad to read, in Dr. Vilter's discussion of sore tongue and sore mouth, that the importance of inspecting the tongue "has been re-established in every history and physical examination."

The book can be commended to all who would like to have an authoritative clinical interpretation of the signs and symptoms most often encountered in practice.

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**The American Illustrated Medical Dictionary**—A complete dictionary of the terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Nursing, Veterinary Science, Biology, Medical Biography, etc.; with Pronunciation, Derivation and Definition. By W. A. Newman Dorland, A.M., M.D., F.A.C.S., Lieut Col., M.R.C., U. S. Army; Member Committee on Nomenclature and Classification of Diseases of the A.M.A.; Editor of "American Pocket Medical Dictionary". Ed. 21. 1660 pages, with 880 illustrations, including 233 portraits. Price: $8.00 without thumb index; $8.50 with the thumb index. With the collaboration of E. C. L. Miller, M.D., Medical College of Virginia. Philadelphia and London: W. B. Saunders Company, 1947.

After looking over the twenty-first edition of Dorland's **Dictionary**, this reviewer can only repeat the comment offered in this **Journal's** review of its immediate predecessor, the twentieth edition, which appeared in 1944: "This edition of Dorland's **American Illustrated Medical Dictionary** maintains the eminence which this book has justifiably held in American medical literature. It is by far, in this reviewer's opinion, the best available American medical dictionary . . . To any practitioner not owning a recent edition of this dictionary, the book can be heartily recommended. It should be on the desk of every physician, or on that of his secretary."

**Introduction to Medical Psychology.** By L. Erwin Wexberg, M.D. 171 pages. Price, $3.50. New York: Grune & Stratton, 1947.

This small book represents a series of lectures given by the author over a period of seven years as an introductory course for sophomores in the subject of "psychology and medicine." The title, "Medical Psychology," is used to emphasize the psychologic side of medical work; it is confusing, however, because the term, "medical psychology," has long been employed as a synonym for psychiatry, particularly abroad.

This confusion inherent in the title carries on through the entire work, and it is difficult in the introduction to differentiate medical psychology from psychiatry. The author discusses first sociologic problems; second, academic psychologic formulations; and third, clinical psychologic techniques. These sections are divided into chapters dealing with the individual and community, knowledge, emotions, temperament, genetic psychology, and the methods of clinical psychology.

If this book were written as an introductory text, it should certainly contain more factual details and fewer generalities. If it were written for lay consumption, it should contain clearer illustrations, more case data, and should be less scattered in structure. Obviously it is not written for anyone with any real knowledge of the subjects concerned.

In this book over-simplification has been carried to an extreme. As an outline of lectures wherein the lecturer actually presents the meat of the problem, it may well serve as a scaffold on which the student can build his notes. Without further amplification in the form of lectures, it represents the scaffold standing alone.

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**New and Nonofficial Remedies—1947.** By the Council on Pharmacy and Chemistry of the American Medical Association. 749 pages. Price, $3.00. Philadelphia: J. B. Lippincott Co., 1947.

The Council on Pharmacy and Chemistry, a standing committee appointed by the Board of Trustees of the American Medical Association, publishes yearly this book which contains descriptions of preparations and articles which have been examined and accepted by the Council. The book provides statements on actions, uses, dosages, tests, and standards of the preparations and articles. The book also contains certain official preparations and other articles, including drug substances for manufacturing use, for which there are not official standards, which the Council believes should be included for the information of the medical profession. New preparations are added throughout the year to the volume via the **Journal of the American Medical Association.**

The book should be of great value to practicing physicians, in that it gives information on the newer drugs and limits itself to scientifically investigated preparations. The latter point is one of no little importance in these days of enthusiastic high-pressure detail men.

The hundred-page section on "Tests and Standards" is of little interest to practicing physicians, and in this reviewer's opinion might well be published as a separate supplement available to those interested in this information.

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# In Memoriam

## ALTON COOK CAMPBELL, M.D.

Dr. Alton Cook Campbell was born in Jonesboro, North Carolina on January 31, 1884. He received his M.D. degree from the University of North Carolina in 1910. Following a ten-month internship at Rex Hospital in Raleigh, he spent a year at the Episcopal Hospital in Philadelphia. He then returned to Raleigh and entered upon the general practice of medicine. With the exception of the time spent as a captain in the army during World War I, he practiced all the time in Raleigh.

Dr. Campbell was connected with the North Carolina State College as college physician for twenty-five years. During this time he treated a multitude of students without a single death. He was instrumental in the growth of the college infirmary from a small thirty-three bed institution to the present four-story modern building with sixty-six bed capacity. He will be sorely missed on the campus of State College.

In June, 1920, he married Miss Elizabeth A. Gailey. This union was blessed with three children, Alton Gailey, Paul Peyton, and Mary Elizabeth. Miss Mary Gailey, his sister-in-law, completed the close-knit family circle which contributed so much to Dr. Campbell's serene and calm manner.

In 1927 he spent three months touring the clinics of Europe. He was a member of the American Medical Association, the Wake County Medical Society, the Raleigh Academy of Medicine, and the staffs of Rex Hospital and St. Agnes Hospital.

In the death of Dr. Campbell the people of Wake County and the medical profession lost a capable, conscientious, hard-working physician. He was a physician in every sense of the word—always mindful of the patient's welfare, available day or night, giving generously of himself and his services.

His loss will be deeply felt by us who have been recipients of his kindness and gentility.

David Kleiman, M.D.
John Rhodes, M.D.

* * *

## FRANK TRUMBO HARPER, M.D.

WHEREAS, the untimely death of Dr. Frank Trumbo Harper has deprived our society of a distinguished member and our community of a physician who served in an outstanding manner, we his colleagues honor him in this manner.

WHEREAS, during the few brief years he was with us, his untiring fight against tuberculosis accomplished so much in the battle to defeat a disease that must be conquered; and

WHEREAS, though he faithfully administered to the afflictions of so many of our citizens, he always found time to render active service in behalf of many civic projects which he believed essential to the welfare of our community and so especially was this true in his Boy Scout work in this district; and

WHEREAS, by his professional ability and buoyant personality he won and deserved the admiration, love and respect of those with whom he came in contact; therefore, be it

RESOLVED, that we express our sincere sorrow and sympathy to his mother, wife, and children in the loss of a noble son and a devoted husband and father.

2. That a copy of this resolution be spread upon the minutes of our society and further that copies be forwarded to his mother, wife and children, and to the secretary of the North Carolina State Medical Society.

Willard C. Goley, M.D.
Donald E. Robinson, M.D.

Resolution adopted by the Alamance-Caswell Counties Medical Society.

# BULLETIN BOARD

(CONTINUED FROM PAGE 682)

## FEDERAL SECURITY AGENCY

Three new members of the Federal Hospital Council, established last year to assist Surgeon General Thomas Parran of the U. S. Public Health Service in the administration of the hospital survey and construction program, were announced recently by Federal Security Administrator, Oscar R. Ewing.

Nelson Cruikshank, director of social insurance activities of the American Federation of Labor, Washington, was appointed to fill the unexpired term of Clinton S. Golden, also of the A.F. of L., who resigned to serve as labor advisor to the American Mission for Aid to Greece.

Dr. James A. Paullin, professor of clinical medicine, Emory University, Atlanta, Georgia, and former president of the American Medical Association and American College of Physicians, will succeed Mrs. Evelyn Hicks of Birmingham, Alabama, whose one-year term has expired.

Joseph W. Fichter, Master of the Ohio State Grange, Columbus, Ohio, will succeed Melville G. Broughton, former governor of North Carolina, whose appointment has also expired.

## VETERANS ADMINISTRATION

Another step in the Veterans Administration program to relieve doctors, nurses and technicians of hospital paper work so that they may devote more time to the care of veteran-patients has been ordered by Dr. Paul R. Hawley, chief medical director. Under Dr. Hawley's latest directive, VA hospitals will set up registrars' offices to handle all of the routine paper work that non-professional personnel can process. VA expects this program to aid the agency's objective of giving veteran-patients medical care second to none.

* * * *

Intensive research into heart disease — which claims the lives of more veterans than any other disease—will be centered at the Veterans Administration Mount Alto Hospital in Washington, D. C. The new research center, a part of which already is in operation, was developed under the supervision of Dr. George P. Robb, widely known cardiologist and assistant medical director of the Metropolitan Life Insurance Company. He will continue as consultant to the cardiovascular research unit.

* * * *

Veterans Administration recently announced the beginning of a limited research program into the use of radioactive isotopes for diagnosing and treating certain types of diseases afflicting veterans. Dr. George M. Lyon of Huntington, W. Va., as chief of VA's Radioisotope Section, will be in charge of the program.

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**Poverty causes illness**, and illness, in turn, is a major cause of poverty. This vicious circle has long been recognized. It has also long been appreciated that it may be broken by social-economic measures, income, and living standards, and by medical care competent to lower the incidence and severity of disease.—Medicine in the Changing Order, Rep. N.Y. Acad. Med. Comm., The Commonwealth Fund, 1947.

# NORTH CAROLINA MEDICAL JOURNAL

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## PAUL PRESSLY McCAIN: 1884-1946

It is a deeply appreciated honor to have a part in the publication of this issue of the NORTH CAROLINA MEDICAL JOURNAL which, one year after his death, is dedicated to the memory of Paul McCain, the "Beloved Physician" of our commonwealth.

Paul McCain's life was devoted to furthering the welfare of tuberculous individuals in North Carolina. A South Carolinian by birth, he strove throughout his whole professional life for the advancement of the tuberculous in that "valley of humiliation" situated between two mountains of conceit (so stated), Virginia and South Carolina. Renouncing his birthright as a native of one of the two mountains (both of which we all greatly respect), Paul McCain did more for the prevention and cure of tuberculosis in the Old North State than any other individual ever has, and he did it by means of a triad of qualities that is rarely found in one man.

He was gifted to be an excellent clinician, always abreast of what was newest and best, and an outstanding executive, who was able to harmonize and correlate the work first of one, then of two, finally of three sanatoria, widely scattered, that eventually came under his supervision and control. Perhaps best of all, he was a good politician who could get, or almost get, what he wanted for his institutions and his patients—*never* for himself, let it be stressed—from the "Powers that Be" in Raleigh. He accomplished this last feat simply by the frank simplicity of his personality, by his transparent sincerity and honesty, by the obviously moderate demands that he made, and by his revealing proofs of their necessity—for others! Paul McCain was no man to go self-seeking!

He did not have an easy time down the years. He had many struggles, in most of which he triumphed. I think that his chief weapon was the use of a verse from the Bible: "A soft answer turneth away wrath." Of this he was a past master. I know that he was often angry with that "righteous indignation" which Jesus Christ condoned and which, on occasion, He exercised. I never knew Paul McCain to fly into a temper, to use unwelcome words, to lay himself open to any accusation of seeking more for his cause than he felt was justified and justifiable.

Of his own personality it is a bit difficult for me to write, for I loved him very dearly and sincerely, and his death has robbed me of one of my deepest friendships. And the way of his going seemed so vain, so useless, so futile, to us of finite minds! But some day we will know the answer!

No man in North Carolina was more beloved by people, patients, and colleagues than was Paul McCain. His smile, his gentle approach, the complete unselfishness of the man were apparent at a first meeting; and, which is more to be wondered at, that first impression was never dispelled. How many times have I heard patients say: "Dr. McCain said this"; "Dr. McCain said that"; or "I went to see Dr. McCain and I felt so much better after my visit." This man had those twin gifts of the true physician—the Science and the Art of Medicine. The first is vital indeed, and the second is essential if one is to devote one's life to the treatment of patients whose disease lasts from three to twenty years; indeed, sometimes I think that the Art of Medicine is almost more important than the Science in the management of chronic illness.

I know that Paul McCain had his reverses, his fights, his vicissitudes. I do not know the details thereof—he was never a man to bemoan his troubles; he took them on the chin and dismissed them as far as others were concerned with his disarming smile—but I know that he had them and met them quietly and heroically. I succeeded him as president of the Medical Society of the State of North Carolina. It was a very pleasant duty, as the incoming president, to present to him the President's Jewel. I cannot better end this brief tribute to the memory of my dear friend than by quoting the words I said to him on that occasion, selecting a passage from the Greek poet Bacchylides:

> Countless are the high qualities of heroes,
> But one there is, set on high, far
> transcending all,
> His it is who, in whatever work his hand
> finds to do,
> Steers his course with righteousness of
> heart.

PAUL H. RINGER, M.D.
Asheville

I did not know Dr. McCain well. One did not have to know him; you felt him. What is this supreme quality that just a few human beings possess? Upon what does it depend? Does it permit analysis? If it did permit analysis it would not exist. This rare quality of a living being that goes on and on after death, that touches one gently in moments of wrath and harsh judgment, that urges one onward for purposes of worthwhileness, that serves as a solace in failure, does not depend upon this characteristic or that characteristic; like God it is. This strength of calmness, this poise in the tumult, this honesty as a way of life.

WM. DEB. MACNIDER, M.D.
Chapel Hill

"Doctor McCain was a man of unusual ability, enthusiasm, inquisitive mind, and great intellect coupled with a sincere desire to render altruistic service to his fellowmen. He occupied a very high place in the esteem of those who worked with him and knew him well.

"His stewardship as superintendent of the state's tuberculosis hospitals and the great interest he manifested in his patients over many years was responsible primarily for a great reduction in mortality and morbidity rates from tuberculosis in the state of North Carolina. That his people were acutely conscious of his great contributions is attested by the fact that he was signally honored by his profession and his state a number of times.

"As a public-spirited citizen, he was always willing and anxious to help with any program which seemed to be for the best interests of his people. It was on a mission of service to his profession and his state that the catastrophe came which ended his career.

"A devoted husband and father; a kind, generous, and understanding friend; a Christian gentleman has gone from among us. To have known and been associated with him was a benediction. The world is better as a result of his having passed this way. We shall not soon forget him. The results of his splendid service to humanity and the influence of his inspiring personality and life will live on."

—From a resolution written by Dr. Fred C. Hubbard and adopted by the North Carolina Medical Care Commission.

Paul Pressly McCain, M.D.
June 26, 1884 — November 25, 1946

# TUBERCULOSIS IN THE SOUTHERN STATES

JULIUS L. WILSON, M.D.
NEW ORLEANS, LOUISIANA

The distinguishing features of the southern area of the United States are climatic, ethnologic, and economic. The higher mean annual temperature, the biracial population, and the predominantly agricultural economy are factors which might be expected to influence the incidence and course of tuberculosis in this area. Even more than elsewhere, another element has been decisive on the Southern front of the long war between *homo sapiens* and the Mycobacterium tuberculosis. That is the men furnishing the generalship—the application of intelligence and energy to the strategy of fighting tuberculosis in these states.

## *Influence of Climate*

There was a time in the first half of the nineteenth century when physicians advised their consumptive patients to move to a warmer climate. It was generally believed that cold weather and moisture acted as an initial cause of pulmonary disorders, including tuberculosis. In 1850 Daniel Drake published his classic and monumental work, "Principal Diseases of the Interior Valley of North America," a pioneer study of diseases considered geographically and statistically. From records kept at army posts and the mortality rates of various cities, Drake concluded that there was "no evidence in support of the current opinion concerning the origin of a tubercular diathesis from cold and moisture." On the contrary, he urged consumptive persons from the Southern states to seek a colder climate in summer, to take voyages to Minnesota ("now a settled region"), and to go to the mountains of North Carolina. At the same time he stated that climate had been overestimated as a factor in the production of tuberculous disease. He observed very acutely that the deficient diet on some plantations seemed to promote tuberculosis, and also that the presence of malaria might be a factor in the greater mortality from tuberculosis in the South than in the North.

Seventy years later, when it was an accepted medical opinion that a northern climate and higher altitudes were more suitable for the treatment of tuberculosis than such regions as the southern seacoast, Bushnell(1) wrote: "Northern cities are more favorable for longevity than southern cities, but the climate has little if anything to do with the comparative mortality from pulmonary tuberculosis in large cities."

With the establishment of sanatoriums for the treatment of tuberculosis in every part of the South, it has become apparent that patients recover equally well from this disease in every climate and at every altitude within this area. This finding confirms the opinions of Drake and Bushnell that other factors are much more important than climate in any difference in morbidity and mortality figures which may exist between the various sections of the United States.

## *The Negro and Tuberculosis in the South*

The fact that two races live side by side in the Southern states affects the problem of tuberculosis in this area chiefly because the Negro component of the population (approximately nine million) has a much higher death rate from tuberculosis than that in the country as a whole. Therefore, their high mortality rate raises the total death rate for tuberculosis in this region. However, it would be erroneous to conclude hastily (1) that the Negro has always been more susceptible to tuberculosis than the white person, (2) that this segment of the population accounts at present for all the difference in tuberculosis mortality rates between Northern and Southern states, or (3) that the incidence of tuberculosis is actually greater in Negroes than in white people.

There is statistical evidence that prior to 1862 the mortality rates from tuberculosis were practically the same for white people and Negroes in the South. Jones(2), citing the records of the city of Charleston, South Carolina, from 1822 to 1900, showed that it was only after the Civil War suddenly freed the Negro and removed his economic shelter that such tremendous tuberculosis mortality rates as 675 deaths per 100,000 appeared. At present the mortality rate from tubercu-

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From the Departments of Medicine, Tulane University School of Medicine and the Ochsner Clinic, New Orleans, Louisiana.

1. Bushnell, G. E.: Study in the Epidemiology of Tuberculosis, with Especial Reference to Tuberculosis of the Tropics and of the Negro Race, New York, William Wood & Co., 1922.
2. Jones, T. J., cited by Bushnell (1).

losis for Negroes in the South is declining steadily. The explanation for the fact that their rate is still twice that of the white population is not relevant to this discussion. As has been stated by McCain(3), it is probable that a number of factors cause this difference.

It is commonly believed that the higher death rate from tuberculosis in the Southern states is due entirely to the high mortality rate in Negroes. A comparative study of the figures for white and Negro deaths in Northern and Southern cities or states shows at once that the mortality rate from this disease is greater among white citizens in the South than among those in the North, whereas the reverse is true of the Negro. Generally speaking, the Negro mortality from tuberculosis increases from south to north, whereas the white mortality rate decreases as one goes in the same direction. In the Northern states the Negro death rate is more than five times that of the white population; in the South their rate is less than three times that of the white, and is declining more rapidly. Consequently, we cannot ascribe our greater incidence of this disease directly to the non-white element of the population. As this biracial problem becomes a national one because of the migration of Negroes to all parts of the country, it is even more apparent that its effects on tuberculosis are indirect. The racial problem has held the Southern states back economically rather than by furnishing an uneradicable focus of infection.

Surveys of the population have repeatedly shown that the incidence of demonstrable pulmonary tuberculosis is lower among Negroes than among white people of the same age, sex, and general economic status(4). Therefore, the Negro population contributes less than its share of cases of tuberculosis in the Southern states, although its mortality rate is higher because of the shorter duration of life after tuberculosis is contracted. By the same token, the spread of tuberculosis (outside of the immediate family) is not maintained to the same extent by Negroes as it is by the more numerous and more chronic cases of tuberculosis among white people. In general, it may be stated that the Negro component of the population is the victim of poverty and disease rather than the cause of the continued prevalence of tuberculosis in this area.

### *The Effects of a Crippled Economy*

The major problem of the Southern states for the past eighty-two years has been economic. Agriculture in the South has never recovered from the major operation of the Civil War. This fact, together with the difficulties of transition to a balance between agricultural and industrial development, has played a major role in the cause of tuberculosis and in the obstacles to the control of this disease. Widespread malnutrition, infestation with parasites, malaria, and venereal disease have resulted directly or indirectly from poverty to prepare the soil in millions of bodies for the seed of tuberculosis. Lack of education, poor sanitation, inadequate health departments—all stemming from the paucity of state income through taxation—have in turn hampered any control measures. The South had been poverty stricken so long that many of its states developed an attitude akin to self-pity, by which all deficiencies in sanitation and education were excused as due to the lack of funds, even long after a measure of prosperity came to planter, mill owner, and the state treasury. These states were lacking both the means to attack tuberculosis and the necessary faith in the present and future to do so. Were it not for certain farsighted individuals and their leadership, the South might be much further behind in the race to conquer tuberculosis than it now is.

### *Influence of Individuals*

After travelling through the South in the 1840's, Daniel Drake(5) wrote: "The consumptives of Florida and Alabama who may not be able to wander far from home have a good resource in the beautiful Valley of the French Broad, Buncombe County, North Carolina, where at an elevation of more than 2000 feet they can enjoy the comparatively cool and invigorating influence of a climate, which I was assured by its physicians, is but little infested with consumption." Thus, long before Trudeau made the Adirondacks a resort for the tuberculous, the doctors of Bun-

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3. McCain, P. P.: Tuberculosis among Negroes in the United States, Am. Rev. Tuberc. 35:25-35 (Jan.) 1937.
4. Edwards, H. R.: Tuberculosis Case-Finding: Studies in Mass Surveys, Am. Rev. Tuberc. supp. 41:3-159 (June) 1940.
5. Drake, D.: Principal Diseases of the Interior Valley of North America, Philadelphia, Lippincott, Grambo & Co., 1851, 2nd series, p. 901.

combe County, North Carolina, started the reputation of that locality as a place for the cure of tuberculosis! Chaille[6] of New Orleans visited Asheville and wrote articles in medical journals extolling the benefits to invalids of residence among those mountains. In 1875 Gleitsmann opened in Asheville the first sanatorium for tuberculosis in the United States. Although he did not continue this institution for many years, there has followed him in the same city an unbroken line of skilled physicians including von Ruck, Minor, and Ringer.

When the full meaning of Koch's discovery of the tubercle bacillus was realized by gradually widening circles of the medical profession, the attack upon this disease became something more than the treatment of a few well-to-do patients. The first half of the twentieth century has seen both treatment and control measures extended to the masses of the population, where tuberculosis had long ranked as the first cause of death. In 1903 George Brown of Atlanta was a founder and first secretary of the American Congress for the Prevention of Consumption, one of two rival organizations which were the direct cause for the formation of the National Tuberculosis Association in the following year. At the organizational meeting of the National Association in Baltimore there were present, in addition to Osler, Welch and other local physicians, C.L. Minor of Asheville, T. E. Oertel of Atlanta, and M. M. Smith of Texas. City and state tuberculosis associations were founded all over the South between 1904 and 1917 through the leadership of such men as these, with the support of a few laymen who had become interested through personal contact with the disease.

As if in response to a demand, men appeared in various states who were not only good physicians and administrators but who were also able to carry the need of the people for tuberculosis facilities directly to the state legislature until funds were appropriated. To mention only a few of these, special credit must go to L. B. McBrayer and Paul P. McCain from the progressive state of North Carolina. Still among us are Drs. Henry Boswell of Mississippi, J. B. McKnight, of Texas, J. D. Riley of Arkansas, P. A. Turner and E. G. Murray of Kentucky, V. F. Cullen of Maryland, and R. D. Thompson of Florida.

These physicians and others whose names are still honored locally became the leaven in the lump of ignorance, indifference, and parsimony toward tuberculosis in the Southern states. The organization of sanatoriums, clinics and societies, the training of hundreds of younger physicians, and the untiring education of the medical profession, state officials, patients, and the general public became their life work. With less financial resources than in most of the Northern states and with more poverty and malnutrition to foster tuberculosis among their fellow citizens, they have accomplished wonders. To the materially minded the hospitals which they have built (and administered so well) stand as monuments to their good work much as St. Paul's Cathedral rises over Sir Christopher Wren. To those interested in statistics the constantly falling mortality rates from tuberculosis in these Southern states attest the success of their efforts. To the humanitarian the thousands of recovered lives of patients treated and the millions of healthy, tuberculosis-free citizens, both children and adults, are their living monument.

In summary, the incidence of tuberculosis has been modified in the Southern states by a number of factors, including climate, biracial population, and economic conditions. Of these, the last has been most important, both in causing the high death rates from tuberculosis in the past and, more recently, in leading to the improvement in health which is now taking place. Of equal importance with these epidemiologic factors are the efforts of the men, so well represented by the late Dr. Paul P. McCain of North Carolina, who have tirelessly applied our knowledge of the causes of tuberculosis to the control of this disease in the South.

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**When a physician encounters an infant or child with a positive tuberculin test,** he has six clear-cut responsibilities: he must classify or describe the lesion, judge activity, determine communicability, seek the source of infection, make recommendations for therapy based on specific objective data and, last, follow each patient carefully at frequent intervals at least until all evidences of activity have subsided or until resolution of the initial lesion is complete. —R. V. Platou, Am. Rev. of Tbc., April, 1947.

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[6] Chaille, S. E.: The Climatotherapy of the American Mountain Sanitarium for Consumption, New Orleans M. & S. J. 3:791-806, 1876.

# RECENT ADVANCES IN THE CHEMOTHERAPY OF TUBERCULOSIS

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Despite the remarkable achievements attained during recent years in the chemotherapy of the infectious diseases, many questions remain unanswered and many problems unsolved. One of the most important of these problems is the chemotherapy of tuberculosis. Although the mortality rate from tuberculosis has steadily declined during the past half-century, it remains the first cause of death during the most productive years of life, and is still responsible for approximately fifty thousand deaths annually in the United States. The need for more effective preventive and therapeutic measures for the treatment and control of tuberculosis is obvious.

## *Historical Background*

For centuries, chemotherapy has been sporadically and often empirically applied in the treatment of tuberculosis. Numerous drugs and chemical compounds have been tested in the experimental laboratory and clinically. Many agents have been shown to have varying degrees of bacteriostatic or bactericidal effect on Mycobacterium tuberculosis *in vitro*, but until recently all have proved ineffective against tuberculosis in experimental animals and human patients.

Unjustified claims have been made concerning the therapeutic value of a large number of chemical agents in tuberculosis, despite experimental and clinical evidence to the contrary. The prolonged and sporadic use of gold salts, despite their severe toxic effects, is an illustration in point.

The fundamental nature of tuberculosis, the characteristics of the tubercle bacillus, and the innumerable variables in the parasite-host relationship have contrived to encourage, disillusion, and foil chemotherapists in this field, despite persistent efforts.

The accumulation of fundamental knowledge in the basic sciences, especially during the latter part of the nineteenth century and thereafter, made possible the first great chemotherapeutic achievement against the infectious diseases—the demonstration by Ehrlich and Hata in 1910 that salvarsan is effective in the treatment of syphilis. This achievement rekindled expectation that chemotherapeutic agents might be discovered which would successfully combat the infectious diseases, including tuberculosis. Following Ehrlich's discovery, however, further progress in chemotherapy of the infectious diseases was slow and disappointing.

Among those disappointed was Robert Koch(1), who turned his attention from chemotherapy to tuberculin therapy. Koch and many others held great hope for tuberculin therapy, and for some time experimental pathologists, immunologists, and clinical investigators were to explore and emphasize the potentialities of the immunobiologic approach to the therapy of the infectious diseases.

Precise knowledge of tuberculosis has accumulated largely during the past half-century. Because of the early lack of such knowledge, treatment of this ancient malady was constantly changing, and until comparatively recent times was of limited success.

Numerous drugs(2) and chemical compounds have been tested in the treatment of experimental and human tuberculosis. Arsenical preparations have been used since the eleventh century; gold and mercury since the sixteenth century; and cod liver oil and creosote since about the seventeenth century.

Throughout the years the effectiveness of these and other chemotherapeutic agents for the treatment of tuberculosis has remained highly controversial, and their mode of action conjectural. Claims concerning their therapeutic effect were usually based on clinical impressions, fortified somewhat in more recent years by the knowledge that certain chemical compounds inhibit the growth of tubercle bacilli *in vitro*. Koch and others, however, repeatedly emphasized that the bacteriostatic or bactericidal action of a chemical substance *in vitro* does not imply that the drug will exert a similar effect on the tubercle bacillus *in vivo*. Koch(1) also emphasized that "the success of an animal experiment gives no certain indication of the result of the same experiment upon human beings." Had this basic principle been given due consideration through the years, much of the sporadic over-enthusiasm on the part of some clinicians regarding the value of certain chemotherapeutic agents in the treatment of tuberculosis might have been avoided.

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It is essential that this fundamental principle be applied in the present evaluation of the therapeutic effect of such antibacterial agents as the sulfones and streptomycin in the treatment of tuberculosis. It has been demonstrated that the antituberculosis action of the sulfones(3) is much greater in experimental animals than in human patients. It should also be emphasized that the toxic effect of antibacterial agents used in the treatment of tuberculosis may be significantly different in experimental animals and in man. Streptomycin causes vestibular dysfunction frequently in man, but rarely in experimental animals.

Various gold salts, one of the most recent being sanocrysin(4), have been used sporadically in the treatment of tuberculosis for centuries. Following the demonstration by Koch that gold salts inhibit the growth of tubercle bacilli *in vitro,* their use again became popular, particularly in Europe, despite the fact that Koch emphasized that they did not favorably influence the course of experimental tuberculosis in animals. Sanocrysin was used widely between 1924 and 1936; its application has declined again during the past few years, however, after further demonstration that it does not significantly alter the course of tuberculosis in animals or man, but that it produces severe toxic reactions in man(5).

### *Early observations on bacterial antagonisms*

The significant observations by Tyndall(6) in 1876, and by Pasteur and Joubert(7) in 1877 that certain microorganisms are antagonistic to other bacteria did not go unheeded. Further developments in this field were destined to pave the way for later extensive investigation in the field of microbiology, and the eventual perfection of effective antibiotic therapy for many of the infectious diseases.

Almost three quarters of a century ago, Pasteur and Joubert(7) prophesied that this antibiosis or antibiotic action of certain bacteria might have therapeutic potentialities. Despite their prediction, very little progress was made in this direction for another thirty-five years, or until the early part of the twentieth century.

In 1912 and 1913, Rappin(8) announced that the filtrate of broth cultures of Bacillus subtilis, Bacillus mesentericus and Bacillus megatherium strongly inhibited the growth of the tubercle bacillus *in vitro.* He also claimed that injections of filtered cultures of B. mesentericus significantly altered the course of experimental tuberculosis in animals.

At about the same time, Vaudremer(9) announced that Aspergillus fumigatus "digested" the tubercle bacillus *in vitro.* Between 1910 and 1913 he treated some 200 tuberculous patients with a filtrate of A. fumigatus, and reported varying degrees of improvement in some and none among others.*

Although these encouraging results of antibiotic therapy for experimental and clinical tuberculosis were not widely accepted, they undoubtedly increased interest and investigation concerning the possibilities of antibiotics in the treatment of the infectious diseases.

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* In recent years two antibiotics of A. fumigatus—fumigacin and fumigatin—have been isolated. Both inhibit the growth of tubercle bacilli **in vitro.**

### *Recent Advances in Chemotherapy*

Further real progress in chemotherapy of the infectious diseases was to await the demonstration that sulfanilamide and its derivatives were effective in the treatment of pyogenic infections in experimental animals and in human patients. Sulfanilamide and its derivatives, however, were found ineffective in the treatment of experimental and human tuberculosis.

A few years later the sulfone compounds, promin, promizole and diazone—synthetic preparations related to the sulfonamide drugs—were found to alter significantly the course of experimental tuberculosis. The sulfones proved far less effective in human beings, however, than in experimental animals.

There is some evidence to suggest that the combined use of promizole and streptomycin is more effective in the treatment of certain forms of tuberculosis than is either drug used alone. The usefulness of the sulfone compounds in combination with streptomycin is still under investigation.

### *Streptomycin*

Streptomycin, an antibiotic substance, was first obtained from the fungus Actinomyces (Streptomyces) griseus by Schatz, Bugie and Waksman(10) in 1944. It exerts a decided bacteriostatic effect on the tubercle bacillus *in vitro* and a suppressive action against experimental and clinical tuberculosis.

#### *Mechanism of action*

The mechanism of the antibacterial action of streptomycin and other antibiotics is not definitely known, but at least three theories have been propounded: (a) bacteriostatic, (b) bactericidal and (c) bacteriolytic(11). Although several antibiotics have been demonstrated to inhibit the growth of tubercle bacilli *in vitro,* streptomycin is the only one that has been shown to have a beneficial effect on both experimental and clinical tuberculosis without prohibitive toxic effects.

#### *Uses*

Feldman and Hinshaw(12) have shown that streptomycin has a strikingly beneficial effect on experimental tuberculosis in animals. During the past four years Hinshaw and his associates(13) have continuously and extensively investigated the indications, usefulness, and limitations of streptomycin in the treatment of pulmonary and extrapulmonary tuberculosis in man. They have found that streptomycin has a significantly suppressive effect on the course of certain types of pulmonary tuberculosis, more especially on recent disease in which extensive caseation has not developed. Streptomycin has also been found beneficial in the treatment of extrapulmonary tuberculous infections, especially tuberculous fistulas leading to subcutaneous or deep-seated foci.

Baggenstoss and his coworkers(14) have studied the effects of streptomycin on miliary tuberculosis. They have found that not infrequently partial or complete remission of this usually fatal form of the disease may follow streptomycin therapy.

Bunn(15) has recently reported that of 71 patients with tuberculous meningitis treated with streptomycin in the Veterans Hospitals, one third died within six weeks after therapy was begun. Fifteen, or approximately 21 per cent of these patients, however, are now clinically well after completion of treatment. The spinal fluid is negative for tubercle bacilli on culture, but still shows a high protein content and pleocytosis in 13 patients. Two of the 15 patients became deaf, apparently as a result of streptomycin therapy. The remarkable results obtained by Bunn and his colleagues at the Veterans Hospitals in this usually fatal type of tuberculosis would suggest that it may be possible to salvage approximately 20 per cent of patients with tuberculous meningitis if the condition is treated early and adequately.

The drug has been found to have a remarkably rapid and beneficial effect on tuberculosis of the larynx, trachea, and bronchi. It appears to be more effective against acute and ulcerative lesions than against the chronic fibrostenotic types.

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Riggins and Hinshaw(16) have recently pointed out that streptomycin should be regarded as an adjunct to the conventional and effective methods of tuberculosis therapy now widely used, and not as a substitute for any of these.

The proper timing of streptomycin therapy for pulmonary tuberculosis with such procedures as pneumothorax, thoracoplasty and resection surgery should prove of distinct value. Thus used, streptomycin should significantly enhance the results obtained by different therapeutic procedures.

### *Disadvantages*

Although streptomycin is rapidly excreted by patients with normal renal function, it may produce certain toxic effects, some of which are serious. Such effects are especially apt to occur if large daily doses of the drug are administered parenterally and intrathecally. It is believed that 1 Gm. given intramuscularly may prove to be the optimum daily dose for certain types of pulmonary tuberculosis. This dosage is decidedly less toxic than 2.0 to 3.0 Gm. daily. Toxicity does not appear to be as significantly related to *duration of treatment* as it is to *total daily dosage* and to improper excretion of the drug by patients with impaired renal function.

Another important disadvantage of streptomycin therapy is the development of streptomycin-resistant tubercle bacilli(17) *in vitro,* and presumably *in vivo,* among a significant percentage of patients treated over a considerable period of time. It appears that the development of this phenomenon during therapy will probably limit seriously the effectiveness of the drug in the treatment of tuberculosis.

Despite the demonstrated value of streptomycin in the treatment of certain types of tuberculosis, early diagnosis and good sanatorium and hospital care or its equivalent, combined with modern application of pneumothorax, the timely use of thoracic surgery, and adequate rehabilitation with competent medical guidance and supervision, are likely to remain the fundamental basis of the management and treatment of tuberculosis for some time to come.

### *The Task of the Future*

Although one can readily agree with Hart that a substantial part of the bacterial front has been broken as a result of the recent remarkable achievements in chemotherapy of the infectious diseases, nothing resembling a decisive victory of man over micro-organisms can be claimed until world control of tuberculosis is attained.

### *Summary and Conclusions*

1. For centuries numerous drugs and chemical compounds have been used in the treatment of tuberculosis. Until recently none has proved of value.

2. The sulfones and streptomycin have been found to exert a significantly beneficial effect on the course of tuberculosis in experimental animals.

3. Streptomycin has also been shown to exert a remarkable therapeutic effect on tuberculous meningitis and on miliary tuberculosis. Its use for these usually fatal forms of tuberculosis is regarded by many as mandatory. It may also be of significant benefit in certain types of pulmonary and extrapulmonary tuberculosis in man, especially those lesions which have not progressed to extensive caseation and necrosis.

4. Streptomycin has certain toxic potentialities, particularly when used in large doses. Most of its toxic effects are transitory, but some may be permanent and serious. Toxic manifestations may be greatly minimized if the daily dose does not exceed 1 Gm. This dosage appears to influence favorably the course of certain types of pulmonary and extrapulmonary tuberculosis. The toxic effects of the drug must be weighed against the immediate or remote threat of the disease.

5. After an indefinite period of exposure to streptomycin, tubercle bacilli usually become resistant to the antibiotic *in vitro* and presumably *in vivo.* When this phenomenon occurs, the drug appears to lose much if not all of its therapeutic value.

6. Streptomycin should never be used as a substitute for proved methods of treating tuberculosis, but only as an ancillary agent and in conjunction with other basic therapeutic procedures.

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# TREATMENT OF TUBERCULOSIS WITH STREPTOMYCIN

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A few months before his death Dr. P. P. McCain applied to the United States Public Health Service for a grant to support a study on the use of streptomycin in tuberculosis. The story of this drug and of its use to date in the treatment of this disease appears to be a suitable topic for a contribution to this memorial issue of the Journal.

It was a modest statement which Schatz, Bugie and Waksman(1) made three and a half years ago when they announced the discovery of "a new antibacterial substance, designated as streptomycin" which they had isolated from Actinomyces griseus. A second statement(2) a few months later indicated that this antibacterial substance inhibited the growth of Mycobacterium tuberculosis in the culture tube. Within a year after the original announcement, Hinshaw and Feldman(3) had applied the drug to tuberculous guinea pigs and human patients with favorable results.

Since that initial venture, a remarkably significant record has been written in the life history of a remarkably resistant disease. For the first time, a drug is available which exerts a distinctly favorable effect upon a good many types of tuberculosis. Its use in miliary tuberculosis, tuberculous meningitis, and several of the extrapulmonary forms of the disease has achieved far better results than those obtained by any other method of treatment.

The drug has been scarce. It has been available in limited amounts to a few independent investigators, to the Veterans Administration and the Army and Navy, to the American Trudeau Society, and to the United States Public Health Service. These groups together have been responsible for the completed treatment of about 1500 cases to date; in addition, approximately 1000 patients are now receiving this therapy or are about to be started on an outlined therapeutic scheme. The Veterans Administration, the Army and the Navy began their work in June or July, 1946. Almost a year ago the Committee on Streptomycin of the American Trudeau Society obtained a generous donation of 54 Kg. of the drug from the manufacturers for study, and to this amount another 27 Kg. has recently been added. The material has been distributed to eight investigators, who have worked in singularly good cooperation. This work, under the direction of this voluntary agency, has tied in closely with the efforts of several independent investigators, as well as with those of the other agencies mentioned. In general the work has been divided into the following categories:

1. Experiments in the laboratory.
2. Clinical administration and appraisal.
3. Collection and analysis of data.

### *Experiments in the Laboratory*

Very early in the work it became evident that the tubercle bacillus rather regularly develops resistance to streptomycin, and that it is useless to administer the drug longer than three months if the dose has been very large(4). The nature of this resistance is under study. Whether it represents biologic adjustment to a new environment, or the survival and increasing preponderance of natively resistant bacilli which were previously in the body in small numbers is not known.

Many people interested in this question are speculating upon the potentials in the development of resistance to streptomycin. This possibility is still in the speculative state, because insufficient time has passed to allow final evaluation. It is a fact, however, that resistance, once acquired, tends to become attached to the strain as a characteristic. Some strains examined eight and ten months after the development of resistance have been found to have retained this trait. This represents the longest period of observation to date.

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* Superintendent of the North Carolina Sanatoria.

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What are the implications of this observation? If the resistant strain is passed on to a previously uninfected person, it will continue to be resistant to the drug. Even if it produces in that person a type of tuberculosis that is ordinarily susceptible to streptomycin, the drug will have no effect upon his disease. It is conceivable that resistant strains may be passed on in this manner, and that an increasing number of people may contract tuberculosis which is not amenable to the drug. Such a development would eventually destroy the usefulness of streptomycin in tuberculosis.

It seems important, therefore, in the administration of this drug (1) to anticipate the development of resistance and (2) to refuse to use the drug for types of tuberculosis in which it has not been shown to be helpful. In order to anticipate the development of resistance, one should make frequent *in vitro* examinations of the strain after the first six or eight weeks of treatment, and discontinue the therapy at once as soon as it begins to show resistance. One should also refuse to continue the administration of the drug for more than three months if the dose has been as great as 1 Gm. per day. The drug should be withheld in the large number of chronic, fibrous, cavitary cases that represent the "average" case of tuberculosis, because these do not respond.

Other laboratory studies under way are concerned with the toxic manifestations and limitations of dose, and with the excretion of the drug, especially by people with renal impairment. A large proportion of people with damaged kidneys develop toxic symptoms when they are given this drug. Other work is in progress which supplements clinical studies and seeks to explain some of the clinical results; some of it represents treatment of experimental tuberculosis with streptomycin, and some is study upon autopsy material from the bodies of people who have died from tuberculosis while being treated with the drug. Some of it is chemical in nature and seeks further purification of streptomycin, and some of it extends to a study of other antibiotics.

### *Clinical Administration and Appraisal*

A great deal has been accomplished to date in the clinical application of streptomycin, but little actually is known about it. Although many cases have been studied, much remains to be done. But this much can be said: that in certain types of tuberculosis streptomycin works well—far better than any other drug ever brought forward. It is by far the best therapy that has yet been used for miliary tuberculosis. A considerable number of patients with this disease have experienced great benefit from streptomycin therapy. Most of them have lost their symptoms; the x-ray improvement has been remarkable; the sputum has become negative; and about 50 per cent of them appear to be well four to twelve months after treatment. Obviously one cannot use the word "well" in connection with tuberculosis, but the patients are without clinical symptoms of illness. In tuberculous meningitis the results are much the same; at three to six months after cessation of treatment about half of the patients are living, but at eight to twelve months after discontinuation, only about 25 per cent are still alive. Quite a number of these, however, are without symptoms, and a few yield spinal fluid that is quite normal. In tuberculosis of the mucous membranes—particularly of the larynx, trachea and bronchi—the drug exerts a very favorable and rapid influence.

In these three types of tuberculosis the results have been so striking that it is incumbent upon the physician to use streptomycin when he encounters such cases. The drug has also led to marked improvement in patients with draining sinuses from lymph nodes and, at times, from tuberculous lesions of the bone. Tuberculosis of the skin does well under streptomycin. In a large majority of patients with the types of tuberculosis which have been mentioned, remission follows the use of the drug, and in a considerable number it appears that such remission may be reckoned as permanent.

The sobering thought, however, is that in 70 or 80 per cent of all cases of pulmonary tuberculosis the drug as yet has been found of very little benefit. The average case of chronic, ulcerative, cavitary, fibrous tuberculosis yields very little, if any, to it. In almost all cases of pulmonary tuberculosis streptomycin is followed within a few days by loss of fever, diminution in cough, lessening of the amount of sputum, and a definite change in the character of the sputum from thick, purulent or mucopurulent to mucoid. These objective signs are accompanied by a feeling of well-being and often by an increase in appetite, although occasionally the patient finds that the drug abolishes his appetite almost entirely. As a rule, however, this improvement does not last, and in the end the chronic case of consumption progresses about as though the drug had not been used.

Further clinical use of streptomycin has offered certain additional therapeutic suggestions. For instance, good results follow its use in very early (not minimal) tuberculosis. In tuberculous pneumonia, particularly if it is caught in the early days of its inception, the response is frequently remarkable. The use of the drug in tuberculous enteritis has apparently given good results. Quite often the patients with this complication will experience defervescence within three or four days after the beginning of treatment. This is followed by loss of abdominal pain and discomfort, and a day or so later by a change in the character of the stool. The foul odor disappears, and in ten days or two weeks the stool is formed. Experience with the use of the drug in this disease has been limited, however, and the whole subject of tuberculous enteritis is now under more careful study. The same is true for tuberculosis of the bones and joints.

The prophylactic use of streptomycin has also come in for study and for practical application. In cases requiring thoracic surgery it has become almost standard procedure to administer the drug prophylactically. This practice seems to be unnecessary in the performance of thoracoplasty, because spread occurs only very seldom after this operation; in resection, however—where it is necessary for the surgeon to cut through tissues that harbor living tubercle bacilli—it is highly important to use streptomycin. The drug is being used regularly in such cases as a study project by the Veterans Administration.

As studies have gone further, many questions have been raised and many problems have presented themselves. In spite of the fact that 1500 cases have been studied to date, no one yet knows what the drug really does in tuberculosis of many parts of the body—particularly the lymphatic system, the bone, the eye, the genito-urinary tract, the skin, and many types of pulmonary tuberculosis. It is worth mentioning again, however, that the ordinary pulmonary tuberculosis most frequently encountered is but slightly affected by the drug.

In view of the widespread use which streptomycin is now beginning to receive, a word about the toxicity of the drug is in order; for it cannot be given without certain risks. It may cause cutaneous rash, and occasionally exfoliative dermatitis. Dizziness and vertigo are common, and impairment of hearing occurs rarely. Toxic symptoms are very likely to develop when the drug is given to people with renal impairment, as has already been noted; apparently the damaged kidney excretes streptomycin more slowly than the normal one, so that the drug is retained in the blood.

*Note on one clinical study*(5)

One series of observations may be mentioned briefly. This study involved 45 patients with early tuberculosis of the lung. For the most part they came from a large group of contacts that had been under observation by the health department of a large city, and the onset of the disease in most of them could be rather accurately dated. Of the 45 patients, 23 were given streptomycin and the remaining 22 had none of the drug. All patients were selected by the same set of criteria, and alternate cases (or nearly so) fell into the respective groups. In all cases the sputum yielded tubercle bacilli by one method or another. All patients received the same strict bed-rest regimen. Among the 23 patients who received streptomycin, "concentrate" study of sputum at the beginning of treatment was positive in 18; in only 1 did it remain so three to six months after treatment was discontinued. In the others the sputum became negative rather promptly and remained so. This test was positive at the beginning of the period of observation in 16 patients of the other group (the remaining 6 cases were positive upon culture); in only 9 did it become negative during the period of study.

Clearing of the x-ray shadow began by the twenty-second day (average) in the group treated with streptomycin, and by the forty-fourth day (average) in the series which received similar bed rest but no chemotherapy. Spread occurred in 3 cases of the

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5. From a series of observations made at the Maybury Sanatorium, Northville, Michigan, and the University of Michigan, Ann Arbor, by Jenkins, Peck, Reid and Willis; the report on this study is now in press.

latter group, but in none of the former. The degree of x-ray regression during the six-month period averaged 90 per cent in the streptomycin group, 48 to 50 per cent in the control group.

It should be emphasized, however, that although this type of *early* tuberculosis responds well, the average "garden" variety does not.

### *Clinical deductions*

The kaleidoscopic nature of tuberculosis, the sometimes bizarre effect of the drug upon it, and the fact that streptomycin at best merely supplements and does not replace accepted methods of treatment require that its use be confined to institutions for the treatment of the disease. The patient must have sanatorium care and all of the supportive treatment that tuberculosis has always required, along with collapse procedures and other necessary surgical methods. *The drug merely supplements and does not replace accepted therapy.*

## *Collection and Analysis of Data*

It has just been stated that about 1500 cases have been studied to date. These have come mostly from the Veterans Administration and the other services, from the group treated by the American Trudeau Society through a donation from the manufacturers, and from a few independent workers. Studies are under way, particularly by the Tuberculosis Study Section of the United States Public Health Service, to seek further answers as soon as possible.

The plan is to get together chemist, bacteriologist, pathologist, and clinician to talk over the many problems and their interrelations, and to have all of them work concurrently on component parts of the larger problem. This plan is now being carried out in certain forms of pulmonary tuberculosis, in the hope that prompt and decisive answers concerning their response to streptomycin may be obtained. It is hoped that in a comparatively short time specific information may be obtained on the nature of action of the drug, on the types and the degree of tuberculosis that may safely and properly be treated with the drug, and also—just as important—on the clinical limitations of the drug.

At present the drug is being tried in several types of somewhat more chronic pulmonary tuberculosis than has heretofore shown signs of yielding to the drug. Studies are in progress on variations in dose, both as to size and as to interval. Studies are being carried forward in adults and children, and in white people and Negroes. More definite information is being sought on the use of streptomycin in tuberculosis of the bone and joint in children and adults, in various types of tuberculosis of the genito-urinary system, and in enteritis. Studies likewise are going forward as to the cause of vertigo, deafness and related symptoms, and other evidences of toxicity. Efforts are being made also to study the effect of streptomycin used in combination with other drugs, notably the sulfones.

All in all, a considerable body of work is now in progress on this subject. In the work an effort is being made to apply certain controls to clinical studies by the method of having parallel cases for observation.

The Tuberculosis Study Section of the Public Health Service, composed of tuberculosis specialists throughout the country who do not hold government jobs, hopes to provide several answers to some of these important questions. This Study Section is working in close coordination with the Veterans Administration, and the results of their combined efforts will be forthcoming within the next several months.

## *Conclusions*

1. Streptomycin should be used in miliary tuberculosis, tuberculous meningitis, tuberculous sinuses and fistulas, and certain cases of "early" tuberculosis known to have been present only a few days or weeks.

2. The drug should not be used in the average case of chronic fibrous or cavitary tuberculosis.

3. It should not be given to patients unless the functional capacity of the kidneys is known to be normal.

4. It should always be reckoned as an *adjunct* to the accepted measures of bed rest and collapse therapy, and *never as a substitute* for these.

5. Since it is given to patients with active disease, it is highly desirable that the patient be in a sanatorium during treatment.

6. Extensive clinical and laboratory study is in progress on this drug.

# STREPTOMYCIN THERAPY IN TUBERCULOSIS OF THE TRACHEOBRONCHIAL TREE

## *A Preliminary Report*

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To date no large series of cases of tracheobronchial tuberculosis treated with streptomycin has appeared in the literature. Excellent results have been reported in two small series(1). This preliminary report is made at this time so that it may be added to the accumulated experience.

The adverse effect which the presence of bronchial or tracheal tuberculosis, or both, has upon the treatment and the course of pulmonary tuberculosis is well known. Elimination or improvement of the bronchial condition for even a short period of time should favorably influence the healing process of the pulmonary lesion. The use of streptomycin in patients with pulmonary tuberculosis who were coincidentally under treatment for endobronchial tuberculosis, and in some who received streptomycin specifically for endobronchial disease, forms the basis for this report. The diagnosis and complications of endobronchial tuberculosis are outside the scope of this paper.

### *Classification of Cases*

The total number of patients observed(2) was 18—5 male and 13 female. The average age of the patients was 33. Many of the cases were under observation for a considerable period of time before streptomycin became available. The location and extent of the lesions in these patients are described in the abstracted case histories given below. The endobronchial lesions are classified as follows: redness or inflammation, ulceration, granulation, swelling, scarring and stenosis. A patient may have more than one of these types of lesions in any combination.

The patients observed in this study represent all phases of endobronchial disease, from acute, fulminating, ulcerative lesions to healed, stenotic lesions. There was one case of stenosis with no active mucosal lesion. The remaining patients showed one or more of the following evidences of active disease: erythema, edema, ulceration, and granulation, with or without narrowing of the bronchial lumen.

The duration of the disease ranged from three weeks to four and a half years, the average being 11 months. This is only an approximate figure, because many inaccuracies were encountered as to the date of onset of symptoms of endobronchial disease. Several patients presented signs and symptoms of endobronchial disease many months before the lesion was diagnosed bronchoscopically, and in some instances routine bronchoscopy has revealed the presence of endobronchial disease when it was not suspected clinically.

### *Dosage of Streptomycin*

The exact therapeutic dosage of streptomycin in endobronchial disease is not well established. The relative merits of aerosol streptomycin are open to some question. None of the patients in this series received aerosol streptomycin alone. In 2 of the patients who received intramuscular streptomycin alone the response was very dramatic. The drug was given at the rate of approximately 1 Gm. a day. The dosage was usually doubled for the first week, and toward the end of treatment was reduced to 0.5 Gm. a day. In some instances the daily dose was divided into as many as five injections of 0.2 Gm. per day. Two patients received 2 Gm. a day for thirty and thirty-eight days respectively; no special benefit could be observed to result from this prolonged increase in dosage. The largest total amount of streptomycin given was 190.5 Gm. over a period of one hundred and thirty-five days; this long period of therapy did not seem to confer any definite benefit. The most dramatic

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1. (a) Hinshaw, H., Feldman, W. H., and Pfuetze, K. H.: Streptomycin in Treatment of Clinical Tuberculosis, Am. Rev. Tuberc. 54:191-203 (Sept.) 1946; (b) Veterans Administration Technical Bulletin, TB 10-31, p. 6, August 5, 1947.
2. The patients observed were under the care of the following doctors and institutions in Saranac Lake and vicinity: Dr. E. N. Packard, Trudeau Sanatorium (7 cases), Dr. George Wilson and the Will Rogers Memorial Hospital (3 cases), Dr. J. Woods Price (2 cases), Dr. J. N. Hayes (2 cases), Dr. F. B. Trudeau (2 cases), Dr. Wayne Henning, Stony Wold Sanatorium (1 case), and the Veterans Administration Hospital at Sunmount, Dr. Henry Walters, Manager (1 case). The patients of Trudeau Sanatorium received their streptomycin through the American Trudeau Society grant.

effect was obtained in a patient whose lesion was discovered three weeks previous to therapy; the patient received 82 Gm. in eighty-two days, with almost complete disappearance of the endobronchial lesion two weeks after initiation of streptomycin therapy.

## *Results of Treatment*

The results of the treatment are as follows: One patient (case 15), classified as slightly improved, was not satisfactory for study because she was sensitive to streptomycin and the drug had to be discontinued; desensitization was attempted without success. One patient (case 14), who had stenosis without active involvement, showed no change under streptomycin therapy. Two patients (cases 7 and 18) showed no change and were classified as unimproved. In 4 patients (cases 2, 9, 11, 13) there was improvement, with some residual swelling but no active ulceration or granulation. In 10 patients (cases 1, 3, 4, 5, 6, 8, 10, 12, 16, 17) the lesions healed, but left residual stenosis. Two of these 10 patients had a recurrence of the endobronchial disease, one month (case 6) and two months (case 4) later. In the remaining 8 cases the lesions have remained healed to date, and the patients are clinically improved.

Table 1 summarizes the essential data in this series of cases.

## *Report of Cases*

### Case 1

A woman, aged 33, with minimal pulmonary tuberculosis, was suspected of having bronchial disease in June, 1942. On September 3, 1946, bronchoscopy revealed granulation of the right middle lobe bronchus and bronchus intermedius. Streptomycin was started on January 17, 1947. She received 2 Gm. of streptomycin daily for thirty-eight days, 1 Gm. daily for twenty-two days, and 0.5 Gm. daily for thirty-two days—a total of 114 Gm. in ninety-two days. Bronchoscopy on March 4 showed the lesion to be improving. Bronchoscopy on April 22 showed no evidence of active disease, but narrowing of the right main bronchus as a result of scar tissue. The patient's sputum became negative. She has remained well and the bronchial lesion has healed, but there is moderate narrowing of the bronchus.

### Case 2

A 44-year-old female with far-advanced pulmonary tuberculosis was suspected of having bronchial disease in October, 1946. Bronchoscopy done elsewhere showed involvement of the left main bronchus. Bronchoscopic examination on October 26, 1946, prior to streptomycin therapy, showed redness, ulceration, and granulation of the left main bronchus. Intramuscular streptomycin therapy was started on January 30, 1947. The patient received 2 Gm. a day for thirty days, 1 Gm. for thirty-one days and 0.5 Gm. for fifty-nine days. Aerosol streptomycin was started on March 11, 1947, 0.5 Gm. daily being given for thirty-six days. After a week's intermission aerosol streptomycin was started again and continued, in the same dosage, for seventy-five days.

Bronchoscopic examination on March 4 showed no improvement. On April 8 less granulation tissue was seen. On May 20 there was redness but no granulation or ulceration; some narrowing was noted, however. On June 24 bronchoscopy showed some redness and narrowing. Bronchoscopy on August 12 showed no change, although one observer

**Table 1**

| *Case* | *Duration of Disease before Therapy (Months)* | *Total Dosage of Streptomycin (Grams)* | *Days of Treatment* | *Result* |
|---|---|---|---|---|
| 1 | 48 | 114 i.m. | 92 | Healed |
| 2 | 36 | 135 i.m. | 135 | Improved |
| | | 55.5 a | 111 | |
| 3 | 14 | 77 i.m. | 71 | Healed |
| | | 19 a | 38 | |
| 4 | 6 | 52.5 i.m. | 88 | Lesion healed, then recurred |
| 5 | 4 | 30.5 i.m. | 41 | Healed |
| 6 | 9 | 81 i.m. | 86 | Lesion healed, then recurred |
| | | 19.75 a | 72 | |
| 7 | 30 | 45 i.m. | 49 | Unimproved |
| 8 | 11 | 38.5 i.m. | 43 | Healed |
| | | 13 a | 13 | |
| 9 | 1 | 29.5 i.m. | 59 | Improved |
| 10 | 18 | 42 i.m. | 42 | Healed |
| 11 | 5 | 90 i.m. | 90 | Improved |
| 12 | 11 | 35 i.m. | 35 | Healed |
| 13 | 12 | 70 i.m. | 98 | Improved |
| 14 | 36 | 14 i.m. | 14 | No change |
| | | 27 a | 27 | |
| 15 | 24 | 20 i.m. | 19 | ? Improved |
| 16 | 1 | 84 i.m. | 84 | Healed |
| 17 | 36 | 42 i.m. | 42 | Healed |
| 18 | 24 | 72 i.m. | 90 | Unimproved |

i.m.=intramuscular
a=aerosol

felt that redness indicated that the lesion was somewhat worse. Streptomycin was started again on August 17 in a dose of 1 Gm. daily, and was continued for fifteen days. The patient's sputum has been negative since the forty-ninth day of treatment. She received 135.5 Gm. of streptomycin intramuscularly in one hundred and thirty-five days, and 55.5 Gm. by aerosol in one hundred and eleven days.

### Case 3

A 36-year-old woman had minimal pulmonary tuberculosis. Bronchial disease was suspected in January, 1946. Bronchoscopy in Philadelphia on August 5, 1946, showed involvement of the right upper lobe bronchus and right main bronchus. The patient had three bronchoscopic examinations prior to streptomycin therapy; all showed granulation, ulceration, and narrowing of the right main bronchus. Intramuscular streptomycin was started on February 25, 1947. The patient received 2 Gm. daily for six days, then 1 Gm. daily for forty-two days. After a week's intermission the drug was resumed in a dose of 1 Gm. daily for twenty-three days, making a total of 77 Gm. in seventy-one days. Aerosol streptomycin was begun on March 4 in a dose of 0.5 Gm. a day for thirty-eight days—a total of 19 Gm. in thirty-eight days.

Bronchoscopy on April 11 showed marked improvement; the mucosa was relatively normal, but there was some stenosis. The patient showed marked clinical improvement, and the Gaffky count was reduced from vii to ii. Bronchoscopy on September 4 showed complete healing of the bronchial mucosa and less narrowing of the airways. The patient's sputum at this time was negative.

### Case 4

A female patient, aged 36, with moderately advanced pulmonary tuberculosis, was suspected of having endobronchial disease in August, 1946. Bronchoscopy elsewhere revealed involvement of the trachea and left main bronchus. Two bronchoscopic examinations done prior to streptomycin therapy showed ulceration and granulation of the left main bronchus. At the second bronchoscopy the area was treated with silver nitrate solution (25 per cent). Streptomycin therapy was started on February 3, 1947, the patient receiving 2 Gm. a day for four days, 1 Gm. a day for five days, and 0.5 Gm. a day for seventy-nine days—a total of 52.5 Gm. in eighty-eight days. Bronchoscopy on March 25 showed healing of the active lesion, with some scarring and stenosis. Bronchoscopy on May 20 showed a recurrence of the ulceration and more stenosis. The sputum remained positive throughout. At the present time a thoracoplasty is being performed.

### Case 5

A female patient, aged 33, had moderately advanced pulmonary tuberculosis. Endobronchial disease was suspected on September 5, 1944. Bronchoscopy on March 10, 1947, revealed ulceration and granulation in the left main bronchus, which was treated with silver nitrate. Bronchoscopic examinations on May 6 and on June 19 showed slight improvement in the active lesion, but some narrowing of the bronchus. Streptomycin was started on June 25. The patient received 1 Gm. a day for twenty days, then 0.5 Gm. a day for twenty-one days—a total of 30.5 Gm. in forty-one days. Bronchoscopy on September 4 showed that all the active lesions were entirely healed, but the narrowing remained. There was purulent secretion distal to the narrowing, presumably from the pulmonary lesion.

### Case 6

A 36-year-old man with moderately advanced tuberculosis was suspected of having endobronchial disease in June, 1946. Bronchoscopy on February 4, 1947, revealed erythema and swelling of the left main bronchus with occlusion of the left upper lobe orifice. On fluoroscopy trapping of air in the left upper lobe was demonstrated. Streptomycin therapy was begun on February 11, both by aerosol and by intramuscular injection. He received intramuscularly 2 Gm. a day for two days, 1 Gm. a day for seventy days, and 0.5 Gm. a day for fourteen days. During the same period he received by aerosol 0.5 Gm. daily for seven days, 0.25 Gm. daily for sixty-five days. A total of 81 Gm. of streptomycin was given in eighty-six days by intramuscular injection, and 19.75 Gm. was given in seventy-two days by aerosol.

Bronchoscopy on July 23 showed no ulceration or granulation. There was, however, some narrowing of the left main bronchus. Fluoroscopy showed that there was no trapping of air in the left upper lobe. The patient remained clinically well for approximately one month, when there was a recurrence of symptoms. Bronchoscopy on September 19 showed a recurrence of ulceration, granulation, edema, and erythema in the left main bronchus.

### Case 7

A woman, aged 40, had moderately advanced tuberculosis. Bronchial disease was suspected in September, 1944. Bronchoscopy on February 25, 1947, revealed narrowing of the right main bronchus, with active ulceration extending down into the bronchus intermedius. Streptomycin was started on March 24, the patient receiving 2 Gm. a day for four days, 1 Gm. a day for twenty-eight days, and 0.5 Gm. a day for seventeen days—a total of 44.5 Gm. in forty-nine days. Bronchoscopy on May 20 showed that the bronchus was narrowed to approximately 1 mm. in diameter, but that the mucosal lesion had improved. A culture of the sputum on June 25 was positive.

### Case 8

A 27-year-old male patient with minimal tuberculosis was suspected to have endobronchial disease in March, 1946. Bronchoscopy in July, 1946, revealed ulceration, redness, and edema of the right upper lobe and right main bronchus. Bronchoscopy on March 4, 1947, revealed active disease in the right upper lobe bronchus. Streptomycin was started March 21, both by aerosol and by intramuscular injection. The intramuscular dose was 2 Gm. a day for four days, 1 Gm. a day for twenty-six days, and 0.5 Gm. a day for thirteen days—a total of 38.5 Gm. in forty-three days. Aerosol streptomycin was given in a daily dose of 1 Gm. for thirteen days. Bronchoscopy on May 13 revealed healing of the active disease, but some residual stenosis of the right upper lobe bronchus. The sputum was converted to negative.

### Case 9

The patient was a woman, aged 38, with moderately advanced pulmonary tuberculosis. Bronchial disease was suspected in April, 1947. Bronchoscopy on April 15 revealed redness of the right upper lobe bronchus. Streptomycin was started on April 30, 1947, the patient receiving 0.5 Gm. daily for fifty-nine days, the total dose being 29.5 Gm. Bronchoscopy on June 10 showed improvement of the lesion in the right upper lobe bronchus; some swelling still persists, however.

**Case 10**

A 29-year-old woman with moderately advanced pulmonary tuberculosis began to have symptoms of endobronchial disease in November, 1945. Bronchoscopy on March 19, 1946, revealed swelling, redness, and ulceration of the left main bronchus; it was treated with 25 per cent silver nitrate at this examination. The patient subsequently had four bronchoscopies, the last one on April 15, 1947, showing no significant improvement. Streptomycin was started on May 2, the patient receiving 1 Gm. a day for forty-two days. Bronchoscopy on June 19 showed that the lesion was healed but that there was some stenosis in the left main bronchus. The patient's sputum culture remains positive, but the smear is negative.

**Case 11**

The patient was a male, aged 30, with far-advanced pulmonary tuberculosis. Endobronchial disease was first suspected in January, 1947. Bronchoscopy on June 3 showed edema, ulceration, and granulation of the right lower lobe in the region of the superior branch bronchus. Streptomycin, 1 Gm. a day, was started on June 2 and continued for ninety days. Bronchoscopy on August 19 showed improvement; there was no ulceration or granulation, but some redness and edema were still present. Because of the far-advanced parenchymal disease, functional studies were done. These showed that the right lung was performing very little of the total function, and pneumonectomy was performed on October 16.

**Case 12**

A 23-year-old woman with minimal pulmonary tuberculosis began to have symptoms of endobronchial disease in July, 1946. Bronchoscopy on June 10, 1947, showed narrowing and ulceration of the left upper lobe bronchus. Streptomycin was started in a dose of 1 Gm. daily on June 10, and was continued for five weeks. Bronchoscopy on August 12 showed no change in the lesion. On September 19 the lesion was found to be healed with stenosis.

**Case 13**

A male patient, aged 50, had far-advanced bilateral pulmonary tuberculosis. Endobronchial disease was first suspected in June, 1946, and was diagnosed on July 13, 1947. Bronchoscopic examination showed marked stenosis, scarring, and ulceration of the trachea and larynx. Streptomycin was started in April, 1947, in a dose of 0.5 Gm. a day for eight weeks. Because of the severe tracheal stenosis, it was necessary to do a tracheotomy on July 13. Streptomycin was again started on August 8, and continued for six weeks. Indirect examination of the trachea during this period showed clearing of the granulation and ulceration, but marked stenosis persisted. Streptomycin, in a dose of 1 Gm. a day, was again started on October 3. During the first two periods of streptomycin therapy he received 70 Gm. in ninety-eight days.

**Case 14**

The patient was a 32-year-old woman with minimal pulmonary tuberculosis, who was suspected of having endobronchial disease in April, 1944. Bronchoscopy done elsewhere on June 19, 1944, showed erythema of the left main bronchus. On July 22, 1947, bronchoscopic examination showed stenosis of the left main bronchus, but no ulceration or granulation. Streptomycin was given both by aerosol and intramuscularly. By intramuscular injection she received 1 Gm. daily, starting on July 24 and continuing through August 7—a total of 14 Gm. By aerosol she received one third of a gram three times a day, starting on July 24 and continuing through August 20—a total of 27 Gm. Bronchoscopy on August 26 showed no change in the stenosis.

**Case 15**

A female patient, aged 51, had far-advanced pulmonary tuberculosis. Endobronchial disease was first suspected in August, 1945, and was diagnosed on August 5, 1947, when bronchoscopy revealed redness and edema of the right upper lobe bronchus. This area was treated with 25 per cent silver nitrate at this time. Streptomycin was started on August 9. Two grams given daily for a period of one week produced a febrile reaction. She was successively tried on daily doses of 1 Gm., 0.5 Gm., and 0.25 Gm., but even these small doses produced reactions. She is now in the process of desensitization, after having received 20 Gm. in nineteen days. Bronchoscopy on October 7 showed slight improvement, but redness and edema are still present.

**Case 16**

The patient was a 23-year-old male with far-advanced pulmonary tuberculosis, whose endobronchial disease was first suspected on July 3, 1947. Bronchoscopic examination on July 9 showed disease of the right main, middle, and lower lobe bronchi, with extensive granulation, ulceration, and edema. Streptomycin, 1 Gm. daily, was started on July 23, 1947. He is still under streptomycin therapy. Bronchoscopic examination on August 6 showed the lesion to be healed except for one area, 1 mm. in diameter. Bronchoscopic examination on August 20 showed the lesion to be completely healed.

**Case 17**

A 43-year-old woman with minimal pulmonary tuberculosis was first suspected of having endobronchial disease in December, 1944. Bronchoscopy in December, 1944, showed stenosis, granulation, ulceration, and edema of the right main bronchus and the right upper lobe bronchus. Subsequent bronchoscopies on February 1, April 17, June 26, August 14, and October 16, 1945, showed no change. Silver nitrate (25 per cent) was applied to the lesions during the first five bronchoscopies with no marked benefit. Bronchoscopic examination on May 23, 1947, showed that the disease was still active and that stenosis had occurred. Streptomycin was started on August 9, and she was given 1 Gm. daily for forty-two days. Bronchoscopy on September 23 showed that all the inflammation had subsided and that the lesion was healed with stenosis.

**Case 18**

A 22-year-old female patient with far-advanced pulmonary tuberculosis was first suspected of having endobronchial disease in June, 1946. Bronchoscopy on June 25, 1946, showed marked stenosis of the lower portion of the trachea, with redness and edema. Streptomycin was started on April 12, 1947. She received 2 Gm. a day for four days, 1 Gm. a day for six weeks, and 0.5 Gm. a day for forty-four days—a total of 72 Gm. in ninety days. Bronchoscopy on July 8 showed no change in the bronchoscopic findings. The patient is now having a thoracoplasty.

## *Discussion*

The observations on these patients have been made too recently to permit any conclusions as to how permanent the effect of streptomycin on endobronchial lesions will be. That it does have a definite beneficial effect is substantiated by the above observations. Two patients, however, have had recurrences of endobronchial disease after complete healing with stenosis. The recurrence of endobronchial disease may be influenced by the extent of the parenchymal involvement and the development of resistance to streptomycin by the tubercle bacillus. The best effect is evidently obtained when streptomycin is used soon after the appearance of endobronchial disease, since those patients who showed a greater degree of stenosis and narrowing tended to show less response to the drug. The longer the endobronchial disease is present, the more likely it is to produce permanent damage and changes productive of narrowing.

The presence of endobronchial tuberculosis complicates the treatment of the pulmonary lesion. If the bronchial lesion can be rapidly improved, the contraindications to satisfactory therapy for the pulmonary lesion would be eliminated. The ideal end result is healing with a minimal amount of stenosis. It would seem that this could be effected if the lesions were diagnosed early and streptomycin therapy was instituted at an early date. Active disease seems to respond to streptomycin, but the stenotic lesions do not. If an active lesion can be healed at the earliest possible time, there should be little narrowing of the bronchial lumen.

### *Conclusions*

1. Experience in 18 cases indicates that streptomycin therapy is of definite benefit in the management of endobronchial tuberculosis.
2. Early diagnosis of endobronchial lesions, with immediate institution of streptomycin therapy, tends to produce the most desirable result.
3. The long-range benefits of streptomycin therapy in endobronchial tuberculosis cannot be determined at the present time.
4. It must be borne in mind that the presence of extensive parenchymal disease would be favorable to the reactivation of endobronchial disease after streptomycin has effected healing.

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**The Greek death rate from tuberculosis** is reported to be between 250 and 450 per hundred thousand of population as compared with 40 in the United States. —J.A.M.A., July 26, 1947.

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# ARTIFICIAL PNEUMOPERITONEUM IN NORTH CAROLINA

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During the past fifteen years the treatment of pulmonary tuberculosis with artificial pneumoperitoneum, with or without a phrenic nerve crush combined, has become increasingly popular. Recent reports(1), all emanating from Georgia and North Carolina, on the use of artificial pneumoperitoneum in nearly nineteen hundred white and colored patients provide ample evidence that this method of collapse therapy is sufficiently promising to warrant its inclusion, along with artificial pneumothorax and thoracoplasty, in the standard collapse procedures at present available to the physician. The history of artificial pneumoperitoneum, as well as its indications, advantages, complications, and physiology, has been discussed(1,2). Exhaustive information regarding the entire subject is now available in the scholarly monograph of Banyai(3), who has courageously championed this method of collapse therapy in the United States.

The popularity of artificial pneumoperitoneum in North Carolina is attested by the frequency with which it is being used in the collapse therapy programs of the major sanatoria in this state. At the three state sanatoria situated at Sanatorium, Black Mountain, and Wilson, pneumoperitoneum is the method employed in about 50 per cent of all cases in which collapse therapy is used(4). Other methods employed are artificial pneumothorax, separate phrenic nerve interruption, thoracoplasty, lucite plombage, and other surgical procedures. In the large Veterans Administration tuberculosis hospitals at Oteen and Swannanoa, North Carolina, artificial pneumoperitoneum is used even more frequently, constituting approximately 60 per cent of their entire collapse therapy programs(5). Although it is not intended to replace entirely such established methods of collapse therapy as selected artificial pneumothorax, there is good reason to believe that artificial pneumoperitoneum will increase still further in popularity. Since it is doubtful if any drug can fully replace the mechanical closure of many tuberculous cavities, it is quite probable that pneumoperitoneum will be utilized more frequently in the future in combination with the newer antibiotics such as streptomycin.

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1. (a) Anderson, N. L, and Winn, W. D.: Pneumoperitoneum and Diaphragmatic Paralysis: Therapeutic Observations in 110 Negroes, Am. Rev. Tuberc. 52:380-391 (Nov.) 1945.
   (b) Crow, H. E., and Whelchel, F. C.: Diaphragmatic Paralysis and Pneumoperitoneum in 546 White Cases, Am. Rev. Tuberc. 52:367-379 (Nov.) 1945.
   (c) Mitchell, R. S., Hiatt, J. S., McCain, P. P., Easom, H. F., and Thomas, C. D.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis: Results in 710 Cases from 1937 to 1946, Am. Rev. Tuberc. 55:306-331 (April) 1947.
   (d) Moyer, R. E.: Pneumoperitoneum and Phreniclasia in the Treatment of Pulmonary Tuberculosis: A Review of 500 Cases, Dis. of Chest, in press.
2. Anderson, N. L.: The Rationale of Therapeutic Pneumoperitoneum: Physiological and Mechanical Considerations, Dis. of Chest, in press.
3. Banyai, A. L.: Pneumoperitoneum Treatment, St. Louis, C. V. Mosby Co., 1946.
4. Statistics supplied through the courtesy of Drs. C. D. Thomas, H. F. Easom, and J. S. Hiatt.

As more and more patients receiving artificial pneumoperitoneum are being discharged from these sanatoria and others, some difficulty is being encountered in finding local physicians who are familiar with the technique of administering artificial pneumoperitoneum refills. Thus it becomes incumbent on many general practitioners in the state to familiarize themselves with a simple office technique of administering artificial pneumoperitoneum refills to these discharged ambulant patients.

It is the purpose of this paper to familiarize the general practitioner with artificial pneumoperitoneum and to outline a simple and practical technique of administering refills in the office. Many chest physicians who are experienced in the use of both artificial pneumothorax and artificial pneumoperitoneum are inclined to believe that the latter is much easier to give. Actually, in the hands of relatively inexperienced physicians, artificial pneumoperitoneum refills are much safer than artificial pneumothorax refills.

### *Definition*

What is artificial pneumoperitoneum? In the treatment of pulmonary tuberculosis it is the periodic injection of filtered air into the intraperitoneal space, resulting in an elevation of the diaphragms and a lessening of thoracic volume. By virtue of the subatmospheric pressure present in the intrapleural spaces, the diaphragms are readily elevated and the lungs may be collapsed as much as 70 per cent of their original volume (fig. 1). This decrease in lung volume allows the more diseased areas in the lungs to collapse selectively and heal more rapidly, just as they do in pneumothorax. The healing process and duration of therapy appear to parallel, to a large extent, those associated with artificial pneumothorax.

### *Advantages*

1. With artificial pneumoperitoneum, the physiologic relationships of the intrapleural spaces are not materially impaired, and these spaces remain in a functionally active, physiologically subatmospheric state(2). This is not the case with established artificial pneumothorax, where the normal intrapleural pressure is definitely altered and some thickening of the pleurae invariably takes place. With uncomplicated cases of artificial pneumoperitoneum very little change is seen in the peritoneum(6).

2. Both lungs may be collapsed at the same time with one procedure, thus sparing the patient time and discomfort, and necessitating less effort on the part of the physician.

3. Since the lungs are not collapsed into the opacity of the mediastinum, as is often the case in artificial pneumothorax, the healing process may be observed roentgenographically.

4. Pneumoperitoneum is usually a reversible procedure and can, in contrast to artificial pneumothorax, be discontinued and re-induced as necessary(1a,b,c).

5. Spread of the disease to the contralateral lung appears to be uncommon, since both lungs are partially collapsed.

6. Spontaneous pneumothorax resulting from tearing of pleural adhesions and blebs, or from needle punctures of the lung, does not occur.

7. The formation of broncho-pleural fistulas is avoided.

8. Pleurisy with effusion is rarely seen.

9. Empyema seldom occurs.

10. Non-expansible lungs requiring oleothorax, plombage, thoracoplasty, or unroofing operations are not seen.

11. Perhaps the outstanding advantage of artificial pneumoperitoneum over artificial pneumothorax, as far as the general practitioner is concerned, is the fact that fluoroscopic control is not essential. The operator

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5. Statistics supplied through the courtesy of Drs. R. E. Moyer and Peter Galante .

6. Trimble, H. G., Eaton, J. L., and Moore, G.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis: Local Effects on the Peritoneum, Am. Rev. Tuberc. 39:528-536 (April) 1939.

simply injects enough air to inflate the abdomen snugly. He need not worry whether he is puncturing the lung, collapsing it too far, or losing the space—any of which complications may occur with artificial pneumothorax.

### *Technique*

There is no need to describe herein the technique of administering *initial* artificial pneumoperitoneum. This procedure, simple as it usually is, is ordinarily performed in the sanatorium, or by experienced chest

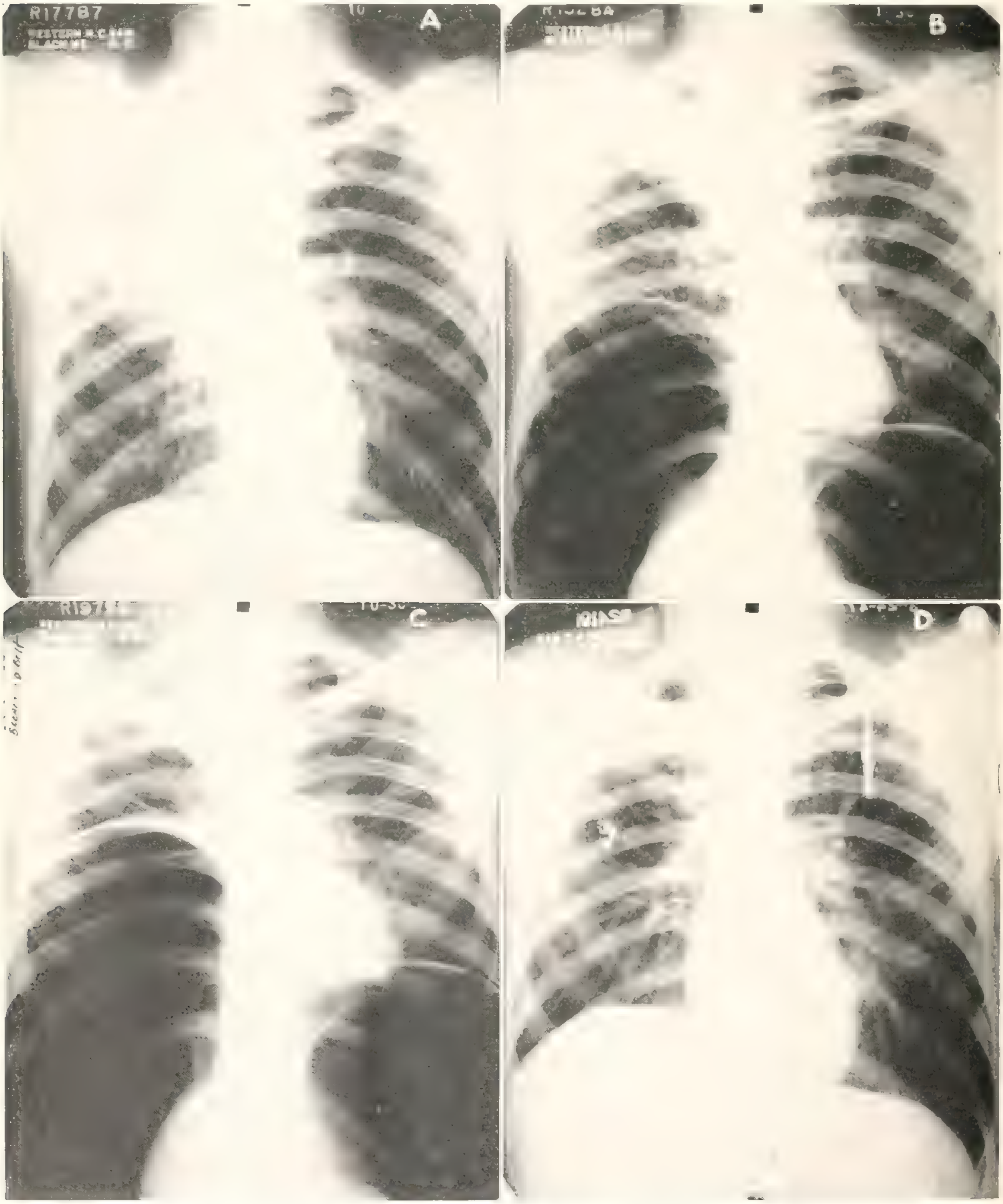

Fig. 1. Representative chest films in a case of far-advanced tuberculosis (a) before, (b and c) during, and (d) after pneumoperitoneum. A right phrenic nerve crush was also done in this case.

physicians in practice. Those physicians interested in this technique may consult almost any one of the references given for details of performing initial pneumoperitoneum. It is the *periodic refill* in established cases which concerns the general practitioner. Any of the usual instruments for administering artificial pneumothorax are quite satisfactory. Among these, the Samuel Robinson apparatus, consisting of two bottles, manometer, suitable adapters, and directional stopcocks, is the most popular method. More recently the Zavod apparatus has been gaining favor in Veterans Administration Hospitals. This consists of a graduated cylinder which administers measured quantities of air under the direct control of a rubber bulb and reservoir. The Davidson apparatus may also be used, but in the hands of most physicians it is less practical than the Robinson and Zavod machines.

With the Robinson-type apparatus satisfactory refills may easily be given, either by using a rubber bulb to force air under slightly increased pressures into the peritoneal cavity, or preferably by elevating the upper water-filled bottle about 50 cm. above the lower bottle. The upper bottle may easily be suspended from a standard used for intravenous medication, or placed upon a platform at that level. To facilitate administration of air in artificial pneumoperitoneum, slightly higher pressures are required than those needed for artificial pneumothorax. The volume of air given at each refill is larger, averaging about 900 cc. of air weekly in established cases. Sufficient air is usually given to produce the pressures found suitable for each individual case in the sanatorium prior to discharge.

The abdominal site for needle penetration has, in established cases, already been determined, and the practitioner can of course use this site. This is usually in the left upper abdomen at the margin of the rectus muscle, about 4 cm. below the costal margin. The technique of skin preparation is identical with that for artificial pneumothorax: that is, the skin is painted with antiseptics such as alcohol and tincture of merthiolate or metaphen. Most patients prefer no local anesthetic, because it requires an additional needle puncture and provides an added chance for introducing infection. One per cent procaine hydrochloride, however, infiltrated at the site of puncture, provides suitable anesthesia for sensitive patients. Patients complain of operators who introduce the needle cautiously and hesitantly. A simple, decisive thrust of the needle through the abdominal wall into the established intraperitoneal space is the preferred technique. In established cases there is an ample, air-filled intraperitoneal space and one need not fear penetration of the abdominal viscera. Ordinary pneumothorax needles are quite satisfactory for pneumoperitoneum refills.

The intervals between refills in established cases range from one to two weeks. Adjustable abdominal binders fitted at the sanatorium appear to lengthen the time interval between refills, since they may be tightened to take up the slack resulting from gradual absorption of air. These binders, however, are not ordinarily necessary.

It is not the purpose of this paper to confuse the reader with unnecessary details. Realistically, anyone who can give pneumothorax refills satisfactorily can, after a little practice, give pneumoperitoneum refills with ease. Physicians who are in doubt as to their technique are encouraged to visit any of the state sanatoria and observe the various techniques. Those physicians who have some difficulty in correctly administering difficult pneumothorax refills will find the average pneumoperitoneum refill much easier.

### *Complications*

Anyone administering artificial pneumoperitoneum should be familiar with its possible complications, even though these are much less frequent than those seen with artificial pneumothorax.

1. *Air embolism* is the most serious complication. It seldom occurs in the hands of careful, experienced operators, and is inexcusable in established cases.

2. *Peritonitis,* whether tuberculous, pyogenic, or otherwise, is a serious complication. It occurs in about 1 per cent of cases—not nearly so frequently as pleural empyema complicating artificial pneumothorax. When it occurs, all the purulent fluid should be withdrawn as completely as possible, the pneumoperitoneum abandoned, and appropriate chemotherapeutic or antibiotic therapy instituted.

3. *Sterile peritoneal effusions* occur in about 8 per cent of cases at some time or other during the course of therapy. They

usually do not impair the effectiveness of the treatment, but they may necessitate paracentesis.

4. *Peritoneal adhesions* may be seen roentgenographically in about 71 per cent of the cases(1a). In the great majority they cause no trouble, but in some cases they may cause pain or prevent satisfactory elevation of the diaphragm.

5. *Hernias*—inguinal, femoral, umbilical, rectus sheath, and diaphragmatic—may be seen. Usually the external hernias may be adequately controlled with trusses during the course of therapy.

6. *Subcutaneous emphysema* may occur in the hands of inexperienced operators. It results usually from failure to introduce the needle deeply enough, and it is rarely serious.

7. *Penetration of abdominal viscera* may occur in rare cases, but again such a complication is highly unlikely in carefully administered pneumoperitoneum.

8. *Other less frequent complications* such as acute appendicitis, cardiac embarrassment, pregnancy, pain, dyspnea, hemoptysis, rupture of the diaphragm, pleurisy, pericarditis, and wheezing may occur, but these are rarely seen in established cases.

### *Conclusion*

In conclusion it is well to bear in mind that, despite very favorable and promising advances against tuberculosis on the preventive, immunologic, chemotherapeutic, and antibiotic fronts, bed rest, nutrition, and collapse therapy are still the standard and accepted methods of therapy which have arrested many thousands of cases in the past. Even assuming that in the future a specific drug against the tubercle bacillus may be discovered, artificial pneumoperitoneum, a recent and most promising method of collapse therapy, will undoubtedly be used for many years to come as an adjunct to closure of cavities.

### *Summary*

1. Artificial pneumoperitoneum has been shown to be an acceptable and very promising method of collapse therapy in the treatment of pulmonary tuberculosis.

2. Artificial pneumoperitoneum is rapidly becoming the most popular method of collapse therapy in North Carolina, where it is now the method employed in about 50 per cent of all cases in which collapse therapy is used in all state and federal sanatoria.

3. Many patients discharged from these sanatoria are requiring air refills in various sections of the state.

4. General practitioners who give artificial pneumothorax refills should familiarize themselves with a simple technique of administering artificial pneumoperitoneum refills in the office.

5. Despite recent favorable advances against tuberculosis on the preventive, immunologic, chemotherapeutic, and antibiotic fronts, collapse therapy, including artificial pneumothorax, artificial pneumoperitoneum, and thoracoplasty, is still essential for proper management of many cases.

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## THE PRINCIPLES OF THE PNEUMOPERITONEUM TREATMENT OF PULMONARY TUBERCULOSIS

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This report is intended primarily to review the subject of artificial pneumoperitoneum in the treatment of pulmonary tuberculosis for the benefit of physicians of North Carolina who are seeing increasing numbers of patients discharged from sanatoria on this form of therapy. Some recent advances in physiologic theory and in the indications for pneumoperitoneum are also presented.

This subject was recently reviewed from the standpoint of history, results reported in the literature, technique, complications, and results in 710 cases seen over a ten-year period(1).

### *Technique*

The administration of pneumoperitoneum is technically quite simple, being both less difficult and less dangerous than artificial pneumothorax. Injections are given at a site about 1½ inches to the left of and below the umbilicus. Subsequent treatments are frequently given in the left upper quadrant after a space is created.

After local skin antisepsis and infiltration with 1 per cent procaine, further procaine

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1. Mitchell, R. S., Hiatt, J. S., Jr., McCain, P. P., Easom, H. F. and Thomas, C. D.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Am. Rev. Tuberc. 55: 306-331 (April) 1947.

infiltration is carried out to include the peritoneum. After breaking the skin with a sharp needle, an 18- or 19-gauge blunt-beveled needle, 1½ to 3 inches long, with an additional opening ground into the shaft near the point on the long side, is inserted at right angles to the skin in a twisting fashion. Penetration of the peritoneum by the needle usually gives a distinct sensation to the operator and localized pain to the patient. Frequently the sensation of puncture of two structures is felt — the posterior rectus sheath before the peritoneum. About 2 cc. of air is injected gently with a small syringe. If the needle is in the free peritoneal space, the injected air is lost and cannot be withdrawn. If the needle is outside the peritoneum, air can usually be withdrawn immediately after it is injected, since it is temporarily in a small, confined space. Further penetration is then made. If air continues to be easily recovered, a new site is chosen.

As soon as it is presumed that satisfactory contact with the peritoneal space has been made, the needle is connected to the tubing of the water-bottle type pneumothorax machine. Manometric fluctuations with breathing occasionally offer further evidence that the needle is in the free peritoneal space. Another extremely valuable guide during air administration is the disappearance of all discomfort during actual insufflation; if soreness or pain accompanies the procedure, one is apt to find later that air has been given in a location other than the peritoneal cavity. The air is given slowly with only a small head of hydrostatic pressure; failure to run in under such low pressure is an indication to choose a new site, since air flows readily and quickly into the free peritoneal space. Because of the possibility of air embolism, no air should be given if bleeding occurs during insertion of the needle nor if pain is felt at the site of injection during insufflation.

The amount of air given at the initial injection in the average case will vary from 400 to 800 cc. Subsequent refills are given at intervals and in amounts dependent upon the tolerance of the patient to the procedure and results being obtained; from 500 to 1500 cc. is the amount usually given at intervals of seven to fourteen days. Elevation of the pneumothorax machine bottle to three feet or so above the level of the patient expedites the inflow of air and has proven a safe procedure in refills. The majority of patients prefer to have refills given without the use of procaine, a sharp needle being used and inserted with a quick thrust. The same general principles are followed as in giving pneumothorax refills.

Intraperitoneal pressures (the pressure measured in the distance between the two fluid levels of the manometer) should not be greater than 20 cm. of water, the average being 12 to 16 cm. Higher pressures are seldom associated with good collapse, since diaphragms which can rise will usually do so without great pressure. An abdominal binder(2) is a valuable adjunct in achieving satisfactory diaphragmatic rise and retaining a normal abdominal contour.

The wide individual variation in tolerance to pressure must be re-emphasized; the tolerance level of each individual is frequently used as a guide to the amount of air given at each refill. Fluoroscopic examination is useful before each refill. If pneumoperitoneum is not beginning to produce the desired results within two or three months, or if it is poorly tolerated, it should be discontinued.

It is our present opinion that a satisfactory pneumoperitoneum should be continued at least six to twelve months longer following cavity closure than a satisfactory pneumothorax. The lung should be allowed to re-expand gradually, and the pulmonary status should be closely followed during this time.

### *Physiologic Considerations*

The factors responsible for the beneficial effects of collapse therapy in pulmonary tuberculosis are not clearly understood. In the absence of adjacent pleural adhesions, relaxation of elastic tissue is felt to promote selective collapse in the more diseased tissues, permitting approximation of cavity walls. Bronchial occlusion collapses cavities, preventing reinflation after the remaining air is absorbed. Diminished blood circulation reduces opportunities for hematogenous seeding and promotes fibrosis. Lymph stasis promotes fibrosis and may explain the decrease in constitutional symptoms(3).

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2. Now being manufactured especially for this purpose for both men and women patients by Spencer, Inc., New Haven, Connecticut.
3. Pinner, M.: Pulmonary Tuberculosis in the Adult. Springfield, Illinois, Charles C. Thomas, 1945.

These supposed effects of collapse therapy appear to depend to a considerable extent on reduction of pulmonary volume. It has been demonstrated that changing from the erect to the recumbent position reduces lung volume—that is, the so-called functional residual air, which is specifically the amount of air remaining in the lung after a quiet expiration—by 25 to 50 per cent(4). That the pulmonary relaxation so obtained plays an important part in the effectiveness of horizontal bed rest in pulmonary tuberculosis seems apparent. Spirometric and other studies to determine the extent of further collapse obtained by adding pneumoperitoneum are now being conducted(4).

Adhesions about the diaphragm and within the pleural space may prevent a satisfactory elevation of the diaphragm. If favorably located, however, adhesions occasionly seem to promote selective relaxation in the desired area.

The concentric relaxation seen with a free pneumothorax would seem to promote a more physiologic rest than the vertical relaxation of a good pneumoperitoneum. Two recent papers, however, suggest that, for various anatomic reasons—particularly the plane and size of the draining bronchi(5)—cavities in varying locations may respond best to relaxation in different planes.

Perhaps the most interesting recent physiologic observation is that ventilatory function, as measured by maximum breathing capacity, is not significantly lowered when the lung volume is reduced by pneumoperitoneum(4). Dyspnea is therefore not necessarily a contraindication to its use, nor a severe or common complication(1)—an advantage not possessed by other forms of collapse therapy.

Electrocardiographic changes after the institution of pneumoperitoneum are not typical or consistent, but frequently reflect the torsion effect of diaphragmatic elevation on the heart. The cardiac apex moves upward toward the left. Elwood, Piltz and Potter(6) found frequent left-axis deviation; Agnello(7) observed slight alteration in the RS and T waves in the three limb leads, and an increase in the interval between the T and P waves; Benatt and Berg(8) found deep $Q_3$ and flattening or inversion of $T_3$ quite regularly, and noted that these changes were reversible with descent of the diaphragms. They made the further pertinent observation that vital capacity was not materially affected by the use of pneumoperitoneum.

### *Indications*

The location of the cavity apparently influences results with pneumoperitoneum as it does with other collapse measures. Seven observers have reported that best results are obtained with cavities in the lower third of the lung(9). We agree with Bennett(10), Gilmore,(11) and McGovern(5b) that cavities in the middle half, especially in the apex of the lower lobe, seem to be most amenable to the vertical relaxation of pneumoperitoneum. Only one author has reported good results in apical cavities(12). As regards type of disease, we concur with six authors who report that chronic productive disease is unresponsive(9b,13). Two observers(14) have reported that some danger is associated with the use of pneumoperitoneum in acute exudative disease.

The accumulated experience with pneumoperitoneum is still too limited to permit the formulation of definitive indications . In gen-

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4. Wright, G. W.: Unpublished data.
5. (a) Collis, L. J.: On Selecting Treatment for the Patient with Pulmonary Tuberculosis, Brit. J. Tuberc. 41:20-26 (Jan.) 1947; (b) McGovern, B. E.: Preliminary Gradation and Combined Collapse Therapy in Pulmonary Tuberculosis, Tuberculology 8:96-107 (Feb.) 1947.
6. Elwood, B. J., Piltz, G. F. and Potter, B. P.: Electrocardiographic Observations on Pneumoperitoneum, Am. Heart J. 19:206-217 (Feb.) 1940.
7. Agnello, V.: Effect of Pneumoperitoneum on the Electrocardiogram, Ann. Ist. Carlo Forlanini, 2:437, 1938.
8. Benatt, A. J. and Berg, W. F.: The Electrocardiogram in Pneumoperitoneum, Am. Heart J. 30:579-592 (Dec.) 1945.
9. (a) Fowler, W. O.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Am. Rev. Tuberc. 44:174-178 (Oct.) 1941; (b) McShane, P. I.: Therapeutic Pneumoperitoneum in Pulmonary Tuberculosis, Tuberculology 6: 123-128 (Sept.) 1943; (c) Rilance, A. B. and Warring, F. C.: Pneumoperitoneum Supplementing Phrenic Paralysis, Am. Rev. Tuberc. 44:323-334 (Sept.) 1941; (d) Cohen, R. C.: Tuberculosis of the Lower Lobe, Brit. M. J. 1:662-663 (May 12) 1945; (e) Steen, P.: Basal Tuberculosis, Brit. J. Tuberc. 39:2-23 (Jan.) 1945; (f) Woodford, L. G.: Pneumoperitoneum with Phrenic Paralysis, Dis. of Chest 8: 296-301 (Oct.) 1942; (g) Hawkins, F. S. and Thomas, G. O.: Basal Pulmonary Tuberculosis, with Special Reference to Aetiology and Treatment, Tubercle 27:82-87 (July) 1946.
10. Bennett, E. S.: Induced Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Journal-Lancet 58:187-190 (April) 1938.
11. Gilmore, D. J.: Pneumoperitoneum with Diaphragmatic Paralysis in the Treatment of Pulmonary Tuberculosis, Dis. of Chest 13:153-161 (March) 1947.
12. Anderson, N. L. and Winn, W. D.: Pneumoperitoneum and Diaphragmatic Paralysis, Am. Rev. Tuberc. 52:380-391 (Nov.) 1945.
13. (a) Crow, H. E.: Pneumoperitoneum: A Form of Compression Therapy in the Treatment of Pulmonary Tuberculosis, J. M. A. Georgia 33:167-173 (June) 1944; (b) Mallick, S. M. K., Malhotra, C. L. and Mohammed, N.: Pneumoperitoneum in the Treatment of Tuberculosis, Tubercle 24:165-173 (Oct.) 1943; (c) Iturriaga, A. P.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Rev. clin. espan. 5:56-61 (April 15) 1942; (d) Edwards, P. W. and Logan, J.: Pneumoperitoneum in Pulmonary Tuberculosis, Tubercle 26:11-22 (Jan.-Feb.) 1945; (e) Mellies, C. J.: Pneumoperitoneum with an Unusual Complication, J. Missouri M. A. 36:430-435 (Nov.) 1939.
14. (a) Stokes, J. B.: Pneumoperitoneum for Pulmonary Compression, Illinois M. J. 73:137-147 (Feb.) 1938; (b) Disney, E. K.: Induced Pneumoperitoneum in Pulmonary Tuberculosis, M. Bull. Veterans Administration 20:178, 1945.

eral, however, it is felt that pneumoperitoneum should be applied after consideration, and even after failure, of more conventional therapy. However, it seems indicated as a *primary procedure* in preference to all other forms of collapse therapy in the following situations:

(1) *Bilateral cavitation, or unilateral cavitation with fresh active disease on the opposite side.* This category includes the troublesome cases with no conclusive roentgenologic evidence as to which side is the source of positive sputum, and for which bilateral pneumothorax, with all its uncertainties and dangers, was formerly the usual method of treatment. One side may be sufficiently improved by pneumoperitoneum to permit effective pneumothorax or thoracoplasty on the other.

(2) *Acute pneumonic or caseopneumonic lesions, unilateral or bilateral.* Pneumoperitoneum is recommended as a preliminary collapse treatment, to be followed if necessary by more definitive collapse therapy at a later date. Pneumothorax and thoracoplasty, frequently used in desperation, are notoriously dangerous in this type of lesion, and bed rest alone, even under ideal conditions, may be inadequate(15).

(3) *Unilateral cavitation.* Pneumoperitoneum, with or without phrenic nerve crush, is worth a trial of four to six months before resorting to thoracoplasty. It is especially valuable if thoracoplasty is unsuitable because of the location of the cavity, if it is not available, or if the patient refuses operation.

(4) *As a supplement to diaphragmatic paralysis.* Pneumoperitoneum is particularly indicated in the case without appreciable elevation of the diaphragm following interruption of the phrenic nerve. From a theoretical and practical standpoint, however, it may be beneficial in all cases of diaphragmatic paralysis by limiting the paradoxical motion which is felt by many observers to inhibit pulmonary drainage, especially of the lower lobes.

(5) *As a supplement to pneumothorax.* Pneumoperitoneum may rarely cause sufficient relaxation of apical and diaphragmatic adhesions not amenable to pneumonolysis or pneumothorax to complete cavity closure and convert sputum to negative, thus avoiding the drawbacks of a phrenic nerve interruption. It may be particularly useful in the case of partially unsatisfactory pneumothorax complicated by spread to the opposite lung, in which abandonment is fraught with greater danger than continuation.

Pneumoperitoneum is also recommended for consideration in the following special situations:

(6) *To obliterate a pneumothorax space.* When a pneumothorax is unsatisfactory, pneumoperitoneum makes it possible to obliterate the pneumothorax space quickly. Occasionally pneumoperitoneum may reduce the hazard of empyema by obliterating the space of an old pneumothorax which has produced a thickened pleura and non-expansible lung.

(7) *To obliterate a post-pneumothorax empyema space,* with or without bronchopleural or pleuro-cutaneous fistulas; results are possible only in early cases.

(8) *To control pulmonary hemorrhage* when pneumothorax is inapplicable or when the side of the bleeding cannot be determined.

(9) *To prevent postpartum spread of unstable disease.* Immediately after delivery of the placenta—or, if preferred, after a twelve-hour postpartum period — the peritoneal space is filled with air (usually 2000 cc. or more). Pneumoperitoneum is continued in the usual fashion, or diaphragmatic levels are gradually returned to normal over a three or four months' period(16).

(10) *In tuberculosis complicated by bronchial asthma.* Pneumoperitoneum offers a form of collapse which is not particularly prone to produce dyspnea and which can be readily withdrawn if respiratory distress makes it necessary.

(11) *To close tension cavities.* The results of pneumoperitoneum in this situation are admittedly uncertain and unpredictable, but it has occasionally produced cavity closure without danger of complications or permanent collapse. Bronchoscopic examination and suitable treatment of tuberculous endobronchitis, if present, should precede the use of pneumoperitoneum. Pneumothorax is notoriously unsatisfactory and dangerous in

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15. Wade, O. L.: Tuberculous Lobar Pneumonia Treated by Pneumoperitoneum and Phrenic Crush, Lancet 1:496-497 (April 6) 1946.

16. (a) Barnes, J.: Artificial Pneumoperitoneum in Pulmonary Tuberculosis and Pregnancy, Lancet 2:976-977 (Nov. 4) 1939; (b) Drury, M. I. and Duffy, J.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Irish J. M. Sc. p. 504-508 (Sept.) 1944.

the presence of a tension cavity. Monaldi drainage is effective in some hands, but its success depends on the location of the cavity, and to a great extent on the skill of the operator and on prolonged, painstaking postoperative care; it is usually only a preliminary to thoracoplasty. Thoracoplasty, lobectomy, and pneumonectomy are applicable in very selected cases. Temporary disappearance of tension cavities is commonly observed and is thought to be due to the occurrence of complete, instead of ball-valve, blockage of the bronchus draining the cavity.

(12) *As palliative therapy in far-advanced cases.* The relief from cough, greater ease in raising sputum, relief of toxic symptoms, feeling of well-being, and in particular, the fact that some active treatment is being offered, make the use of pneumoperitoneum in these cases very gratifying. Occasionally, when it is least expected, a patient believed to be hopelessly ill will respond.

Pneumoperitoneum used for these indications helps to prepare patients for major chest surgery, by healing or sufficiently stabilizing disease on one side to permit thoracoplasty on the opposite side.

Data being accumulated on the use of streptomycin in combination with pneumoperitoneum seem to indicate that this is a logical approach to the problem of cavitation not amenable to collapse or streptomycin alone. The drug should theoretically cleanse the lining of cavities, while collapse should permit the walls to approximate and heal during the stage of relatively clean granulation tissue.

### *Contraindications*

(1) *Chronic fibroid phthisis* with old, thick-walled cavities does not respond to pneumoperitoneum any better than it does to other forms of collapse therapy.

(2) *Cardiac decompensation or recent coronary occlusion.* Though no studies have proven it, there is the possibility that pneumoperitoneum, by interference with venous return or torsion of the great vessels, may cause some circulatory embarrassment which could impair the function of a previously damaged heart. There is no evidence in the literature, nor in our experience, that pneumoperitoneum causes circulatory embarrassment in the absence of pre-existing major cardiac disease.

(3) *Tuberculous enteritis.* Some observers report that pulmonary tuberculosis, when treated with pneumoperitoneum in the presence of clinically active tuberculous enteritis, may fail to improve or may even become worse(1,14).

(4) *Tuberculous adhesive peritonitis* is not a positive contraindication, but there is danger of reactivating the peritonitis by puncture of a viscera during refills. Furthermore, adhesions may prevent adequate elevation of one or both diaphragms.

(5) *Hernia.* Any abdominal hernia, unless properly supported by a truss, is a contraindication.

(6) *Recent abdominal surgery.* Pneumoperitoneum may be instituted six to eight weeks after uncomplicated operative procedures.

### *Complications*

A summary of the complications reported in the literature and those observed in our own experience has been reported(1).

The previous report of six deaths from air embolism in pneumoperitoneum needs correction and addition. The case reported by Rilance and Warring(9c) was apparently the same as that reported by Warring and Thomas(17). To the other five deaths previously reported(1,18), six more must now be added(19), making a total of eleven from all available sources. No other deaths directly attributable to pneumoperitoneum therapy have been found. From the data reported regarding these deaths, it appears that the air has frequently been forced into a solid organ, often the liver, under considerable pressure, or that the administration of air has been continued in the presence of bleeding. Such catastrophes should not occur if low hydrostatic pressures are used and if proper care is taken in selecting the site for injection. Another location should be sought

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17. Warring, F. C., Jr. and Thomas, R. M.: Spontaneous Air Embolism Observed in Case of Pneumoperitoneum, Am. Rev. Tuberc. 42:682-687 (Nov.) 1940.
18. (a) Trimble, H. G. and Wardrip, B. H.: Pneumoperitoneum in the Treatment of Pulmonary Tuberculosis, Preliminary Report, Am. Rev. Tuberc. 36:111-118 (July) 1937; (b) Harrell, C. L.: Pneumoperitoneum in the Treatment of Pulmonary and Abdominal Tuberculosis, Dis. of Chest 6: 273-277 (Sept.) 1940; (c) Simmonds, F. A. H.: Air-Embolism and Pneumomediastinum in Artificial Pneumoperitoneum, Lancet 1:530-533 (April 13) 1946; (d) Roche, G. and Giron, J.: Fatal Accident in the Course of Pneumoperitoneum Therapy, Rev. de la tuberc. 9:115, 1944.
19. (a) Aslett, E. and Jarman, T. F.: Reaction after Pneumoperitoneum Treatment, Lancet 1:304-305 (March 10) 1945; (b) Case, J. T.: A Review of Three Years' Work and Articles on Pneumoperitoneum, Am. J. Roentgenol. 8:714-721 (Dec.) 1921; (c) Browne, N. C. and Corrigan, F. L.: Tuberculous Cavities and Pneumoperitoneum, Irish J. M. Sc. pp. 697-702 (Dec.) 1945.

if bleeding occurs.

The incidence of cases in which abdominal fluid forms is probably greater than recorded. Small amounts of fluid are hard to detect in pneumoperitoneum, whereas the opposite is true in pneumothorax. When patients are fluoroscoped in the upright position, fluid levels may be seen in the free peritoneal space. In most instances these prove to be transitory. Pneumoperitoneum may be continued in the presence of fluid unless it becomes quite extensive. If aspiration is required, replacement of the fluid with air is indicated. It is not clear whether the fluid is indicative of peritoneal irritation by air or is the result of tuberculous peritonitis. The diagnostic criteria and studies, and the management of the patient should be the same in cases of pneumoperitoneum with fluid as in cases of pneumothorax with free pleural fluid.

It is worth re-emphasizing that no serious complications have occurred as a result of penetration of the gut. Extensive subcutaneous emphysema, with no serious sequelae, may occur when air is inadvertently injected into the extraperitoneal tissues.

### *Summary*

1. The technique of administering and continuing pneumoperitoneum therapy has been reviewed.
2. The physiologic effects of pneumoperitoneum have been considered, particularly in the light of recent findings.
3. Indications and contraindications for the use of pneumoperitoneum are suggested.
4. The common and serious complications of pneumoperitoneum have been mentioned.

### *Conclusions*

1. Pneumoperitoneum is a safe, reversible, mild form of collapse therapy for pulmonary tuberculosis. It is not likely to produce severe dyspnea.
2. Pneumoperitoneum exerts its beneficial effect in pulmonary tuberculosis chiefly through pulmonary relaxation produced by reduction of lung volume.
3. Pneumoperitoneum is a useful addition to the program of collapse therapy for pulmonary tuberculosis.

# PULMONARY RESECTION FOR TUBERCULOSIS

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Resection of a tuberculous lung in whole or in part is a relatively new method of treating tuberculosis, even though it was done successfully by Tuffier(1) in 1891. It is not a logical procedure, because tuberculosis is a generalized disease, and removal of the main focus does not necessarily insure the patient's immediate or eventual recovery. There are a number of patients, however, with advanced disease and with various complications who do not respond to the usually accepted methods of collapse therapy. This group of patients, in whom all other measures have failed, have stimulated surgeons to resect the lung in an attempt to cure the disease.

### *Indications*

At present the indications for resection of the tuberculous lung are limited to the following types of cases:

1. Thoracoplasty failures
2. Basal disease that has failed to respond to more conservative measures
3. Endobronchial disease which produces blocked cavities or tension cavities
4. Endobronchial disease which produces bronchiectasis and pulmonary suppuration
5. Tuberculoma
6. The so-called "destroyed lung," which is extensive caseous disease with multiple cavitation.

It is essential that the contralateral lung be comparatively free of disease, and any focus which may have been present in this lung should be arrested, or at least under control. It is also imperative that the patient's vital capacity, after the diseased portion has been resected, shall be adequate to carry on with ordinary physical activities. I can see no sensible reason why the operation should be attempted in patients who have had bilateral disease and whose vital capacity is so low that pulmonary resection leaves them hopeless respiratory cripples, even though it may convert their sputum to negative.

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(1) Tuffier, M.: Pleurolysis in Pleuro-Pulmonary Surgery, Arch. med.-chir. de l'app. respir. 1:28-45 (Feb.) 1926.

If pulmonary resection can be done with a low operative mortality and morbidity rate, and if the late results prove to be good, then I am sure that the indications for resection will be greatly extended.

### *Mortality*

In 1942 Thornton and Adams(2) collected 29 cases of pneumonectomy and 46 cases of lobectomy from the literature, to which they added 5 cases of their own. The majority of these cases were done by the tourniquet technique. The mortality rate from the pneumonectomies in this group was 44.83 per cent, and the results were satisfactory in only 41.38 per cent of the cases. For the lobectomy group the mortality rate was 25.49 per cent, and 68.62 per cent of the patients had satisfactory results.

In March, 1947, Overholt and his associates(3) reported their experiences with pulmonary resection for tuberculosis. In the past two years lobectomy was performed on 35 patients, with an operative mortality of 6 per cent, and pneumonectomy was performed on 69 patients, with an operative mortality of 13 per cent. In the same paper they showed that their previous mortality rate had been 9 per cent for lobectomies and 22 per cent for pneumonectomies. Thus, during a period of twelve years, they had brought the operative mortality to a reasonable figure.

### *Improvements in Technique*

The improvement in the operative mortality rate has been due, in my opinion, to three important factors. The first is the development of the individual ligation technique for lobectomy and pneumonectomy. Instead of ligating the hilar structure *en masse*—a procedure which resulted inevitably in a high percentage of bronchial fistulas and empyemas—the surgeon now dissects out the pulmonary vessels and ligates them separately. The bronchus is cut cleanly and closed carefully with fine silk or stainless steel sutures, and the stump is covered with a pleural flap. Immediately, with the development of this technique, the complications of pleural infection and bronchial fistulas were reduced considerably. Fortunately, in most tuberculous patients the hilar structures are free, and such a technique is not difficult to carry out.

Of secondary importance in reducing the operative mortality and morbidity rate was the realization that the spilling over of infected sputum into the bronchial tree of the contralateral lung was the chief factor responsible for spread of the disease. The anesthetist must at all times keep the airway unobstructed, and the sputum must be frequently aspirated through the intratracheal catheter. At the end of the operation bronchoscopic aspiration of the bronchial tree is helpful. Some operators have devised and used intratracheal catheters with a balloon attached, by which the bronchus of the contralateral lung can be blocked off and protected against contamination. Moody(4) at Duke has devised a balloon which can be inserted into the bronchus on the diseased side and prevent infectious material from spilling over. More important than these methods is the position of the patient during operation. Overholt(3) introduced the prone or face-down position. With the patient in this position, sputum gravitates toward the mouth and the anesthetist can keep the tracheobronchial tree empty. In addition, Overholt uses a paravertebral block anesthesia combined with analgesia, so that the patient can voluntarily cough out the sputum during the operation. I use general anesthesia and place the patient in the face-down position. In my opinion, the position is the important contribution that Overholt has made to the technique of pulmonary resection.

The third most important factor in reducing the complications of intrathoracic operations has been the discovery and use of the antibiotic agents—the sulfonamides, penicillin, and streptomycin.

The most important of these drugs, so far as tuberculosis is concerned, is streptomycin. Both experimental and clinical studies have shown that streptomycin does have a bacteriostatic effect on the tubercle bacillus. At the Veterans Hospital at Oteen, North Carolina, certain clinical studies with streptomycin are being carried out. One of these studies is to determine whether streptomycin will reduce the incidence of spreads and empyema during resection of the lung for tuberculosis. These studies are not complete, but our ex-

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2. Thornton, T. F., Jr. and Adams, W. E.: Resection of Lung Tissue for Pulmonary Tuberculosis, Surg., Gynec. & Obst. 75:312-327 (Oct.) 1942.
3. Overholt, R. H. et al.: Pulmonary Resection in the Treatment of Pulmonary Tuberculosis, Am. Rev. Tuberc. 55:198-222 (March) 1947.
4. Moody, J. D., in discussion at Twenty-Seventh Meeting of the American Association for Thoracic Surgery, Surgery 22:274 (Oct.) 1947.

perience in 25 cases indicates that the use of streptomycin does reduce the incidence of spreads and empyema, and has played a large part in lowering the mortality and morbidity rate. It will take a larger experience to establish this fact, and it will take several years to determine whether the late results can be improved.

### *Conclusion*

At present, pulmonary resection for tuberculosis can be done without a prohibitive mortality rate. It offers a reasonable chance of cure to many patients in whom everything else has failed. If the late results prove as satisfactory as the immediate results, the indications for pulmonary resection will be greatly extended.

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# A HIGH TEMPERATURE IN PULMONARY TUBERCULOSIS WITH EVENTUAL ARREST OF THE DISEASE

## *A Case Report*

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Louisville, Kentucky

A few weeks ago a girl returned to the sanatorium for her periodic check-up. On entering the examination room she asked, "Did you read in the paper about the tuberculosis patient who the doctor claimed had the highest temperature ever recorded in tuberculosis, 107?" She continued, "I guess he didn't know about me, as I had 112." Why she claimed a temperature of 112 I do not know, as the highest recorded in her case was 108.6 F. by mouth. As far as I have been able to ascertain, this is the highest temperature ever recorded in pulmonary tuberculosis with final recovery from the episode. It is quite probable that her temperature went higher than this, but we were too busy with the patient to think of taking her temperature frequently. I believe that Paul McCain would have been interested in this case, and therefore I wish to report it as my contribution to this memorial issue of the North Carolina Medical Journal.

### *Report of Case*

The patient, an unmarried female, was admitted to the sanatorium one day after she stopped work as a stenographer. She was 22 years old, 5 feet, 6 inches tall, and of a small frame, weighing only 98 pounds. Her father had died of tuberculosis in May, 1938, two months prior to the patient's admission. Her mother had taken many months of bed rest for tuberculosis, and her disease was considered arrested. The patient's paternal grandmother had died of tuberculosis. Otherwise the family history was negative.

In childhood she had the usual diseases, including measles and scarlet fever. During adolescence she had pneumonia, many colds, and hay fever. A year previous to admission she was operated on for appendicitis, and had phlebitis following the operation. For years she had suffered from chronic constipation, but her menstrual and renal history was negative. The history of her present illness began only two months before admission, when she noticed that she became easily fatigued and found that she had lost a little weight. During this time a productive cough developed and she began to have a slight fever, first noticed a few weeks prior to admission.

Physical examination showed a frail, highly nervous girl, but was otherwise essentially negative except for her lungs. Chest examination disclosed the physical signs of bilateral active pulmonary tuberculosis. The x-ray showed a moderate amount of mottling in the second right interspace, extending behind the third rib; the rest of the right lung appeared to be clear. The left lung showed infiltration from the second rib to the apex, rather dense behind the first rib, but with no definite cavity; the rest of the lung was clear. Sputum examination was negative. The sedimentation rate was 15 mm. in an hour, the blood count normal, Kahn negative, urinalysis negative. The diagnosis was chronic pulmonary tuberculosis, moderately advanced, bilateral.

One would expect that a case of this sort could be arrested with bed rest and pneumothorax on the left side. Such, however, did not prove to be the case. Before her disease was controlled, the patient had had a bilateral pneumothorax, intrapleural pneumonolysis, phrenic crush, bronchoscopy, and a four-stage thoracoplasty. During the course of her disease she had a probable brain complication which doubtless caused her excessively high temperature.

Collapse therapy was begun in August, 1938, with artificial pneumothorax on the left. A complete collapse could not be obtained, as the apex of the lung was adherent and intrapleural pneumonolysis was not possible. Sufficient compression seemed to be present, however, after crushing of the left phrenic nerve, and pneumothorax was continued. Meanwhile, the disease in the contralateral lung cleared almost completely. The patient gained 8 pounds in weight, and never had a positive sputum.

She was discharged from the sanatorium as a quiescent case on February 6, 1939, to continue bed rest at home and to receive refills at intervals of two weeks from a local physician. During the next fifteen months the patient returned every three months to the sanatorium for check-ups, and it was found that she was doing very well, although the x-ray showed that a slight amount of infiltration persisted in the right lung. Her only complaint was a rather severe reaction after refills. This reaction was controlled by her local physician, who gave rather small amounts of air at more frequent intervals. The girl felt so well that she started to work against medical advice.

Upon her return for a check-up on May 24, 1940, it was found that a new focus of infection had appeared in the first interspace, outer zone, right lung; there was only a suggestion of infiltration in the second interspace, where the disease in this lung had first appeared. The rest of the lung was clear. The left pneumothorax still appeared to be effective in spite of the apical adhesions.

She was re-admitted to the sanatorium on July 7, 1940, and bilateral pneumothorax was instituted, the collapse of the right lung being made effective by intrapleural pneumonolysis. Her sputum continued to be negative for tubercle bacilli.

During the next few months the patient did very well, and it was hoped that her disease would eventually become arrested without any further complications. In October, 1940, she developed a boil on the buttocks. This was incised and healed promptly, giving her only a short time of discomfort. At this time she felt so well that it was difficult for her to stay in bed. She had a constant urge to go visiting, and the nurses frequently had to chase her back to bed.

On December 8, 1940, she complained of pain in the sternal region which radiated around the left side of the chest to the spine. It was so severe that it was only partially relieved by codeine and strapping of the chest. This pain persisted in lessening degrees for a week. Two days after the onset of this pain, however, she began to have pain in the right side, which was found to be due to fluid in the right pleural cavity. It was relieved by aspiration of the fluid. Concurrently, a severe frontal headache developed, radiating to the frontal sinuses and maxillary region, and lasting thirty-six hours. It was attended with nausea and vomiting. She began to run a fever ranging from 101 to 104.6 F., with a pulse averaging 120. Her headache returned with added severity, and could be relieved only slightly with ice caps, codeine, and sodium luminal.

In January, 1941, the fever began to range from 97 to 101, with a relatively slow pulse, averaging 82. This temperature and pulse range continued for the next twenty days, and the severe headaches persisted. On January 21 the temperature reached 105.2 F., with a pulse of 120. On the morning of January 22 the thermometer registered 98, with a pulse of 100. At 5:30 p.m. the temperature was recorded at 103.4 F., and at 8:00 p.m. at 108.6 F., with a pulse of 120.

At the time this high temperature was registered the patient was fully conscious, and before the thermometer had been in her mouth for three minutes she removed it and cried, "My head is killing me!" The thermometer used was calibrated only to 108 F., and as the mercury was approximately 0.6 of a degree above this point, the reading of 108.6 F. was recorded. Had the temperature been taken by rectum with a thermometer capable of recording the temperature, one can only conjecture what the reading would have been. Perhaps this girl is right in claiming a temperature of 112.

During this episode numerous laboratory studies were made. The sputum continued to be negative, and all tests for typhoid, undulant fever and tularemia were reported negative. Blood counts were essentially normal, the white cells ranging from 5,500 to 9,000, with a normal differential, except for an increase in monocytes, occasionally to as high as 10 per cent; the red cell count averaged 3,800,000, and the hemoglobin 78 per

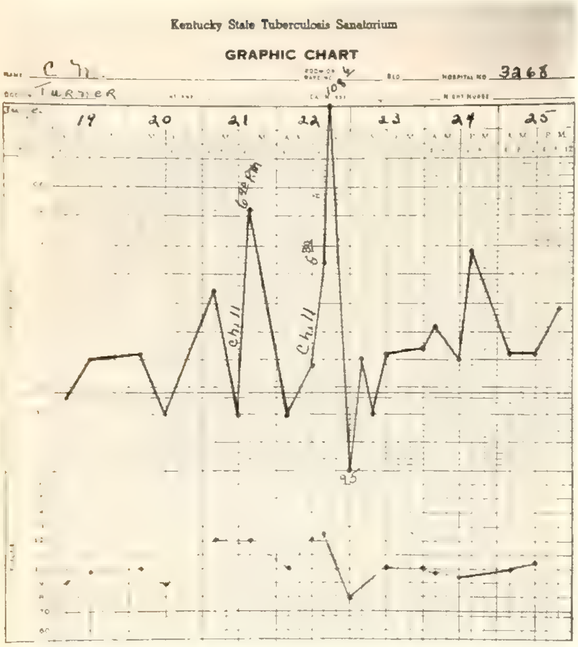

**Fig. 1. A graphic chart of the patient's temperature and pulse during the week that the high temperature was recorded.**

cent. The spinal fluid contained no globulin, no cells, and no tubercle bacilli. Examination of feces was negative for parasites and tubercle bacilli.

Dr. Glen Spurling, brain specialist, and Dr. Murray Kinsman, internist, were called in consultation. Neither expert could find any definite cause for the high temperature. Incidentally, it should be recorded that the eyegrounds were normal, and that x-rays of the cranium and spine were negative.

At this time the patient was not expected to live. Pneumothorax treatments had been discontinued and the lungs were allowed to re-expand. The morning after the temperature of 108.6 F. was recorded, the reading was 95 F. For the next four and a half months the temperature ranged between 102 and 104 F., with a relatively slow pulse, until on June 1 temperature and pulse became normal. During this time severe headache persisted, but gradually became less intense and finally disappeared. On June 1 the episode was concluded. Temperature and pulse were normal, and the patient was without symptoms. X-ray showed the lungs re-expanded, with no evidence of clinical disease. The patient was again discharged from the sanatorium as a quiescent case on June 16, 1941.

Against advice the girl once more started working, and reactivation occurred in her left lung after a period of two years. She was again admitted to the sanatorium, for the first time with a positive sputum. Thoracoplasty was performed in four stages, and for the last two years her disease has been considered arrested.

The patient is at home doing light work. She is handicapped by a spinal deformity, which we feel is due to her being so restless that she could not stay on her pillow following the thoracoplasty operations.

## *Comment*

The cause of the high temperature in this case was not definitely ascertained. It recalled, however, another unreported case seen at this sanatorium about ten years ago in which the temperature reached 107 F. That patient, a middle-aged male, also had severe headaches. The spinal fluid, however, was under pressure, and a few tubercle bacilli were present. The pulmonary tuberculosis was definitely arrested. Dr. Spurling, who was called as consultant, concluded that there was probably a tuberculoma of the brain situated near the fourth ventricle. He operated and found a few tubercles within the fourth ventricle; no other tubercles were seen. The patient died a few days after recovery from the operation.

Judging from this experience, we believe that the patient under discussion probably had a few isolated tubercles in the heat center of the brain which eventually healed.

Finally, I wish to state that the seemingly effective left pneumothorax should probably have been abandoned early and a thoracoplasty done. This perhaps might have prevented the patient's unfortunate experiences, and the thoracoplasty on the right side might not have been necessary.

## *Summary*

A case of pulmonary tuberculosis is reported in which a temperature of 108.6 F. was recorded. The patient is now living, six years after the episode, with her pulmonary disease arrested.

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**When compared with some other diseases,** the purchase price of control of tuberculosis may be considered a bargain. This is so because we know its cause. We know how it is spread. We know how to prevent it, and we know how to treat it. Moreover, it costs pennies to control it, and dollars to tolerate it.—Robert E. Plunkett, M.D., N.Y. Dept. Health, Mar., 1946.

# REHABILITATION IN THE TREATMENT OF TUBERCULOSIS

C. D. Thomas, M.D.

Black Mountain

The treatment of tuberculosis is based on rest and isolation. Physical rest is obtained by placing the patient in bed, and mental rest comes with education concerning his disease and assistance in meeting his social and financial problems. Isolation is best obtained in a sanatorium, where the necessary facilities are provided. The sanatorium also has facilities for all forms of collapse therapy. These include pneumothorax, pneumoperitoneum, phrenic operations, and thoracoplasty. Collapse therapy is of great help in arresting the disease, but best results are obtained where it is used along with bed rest. Even under the best circumstances, bed rest may be necessary for months or even years to bring about arrest of the disease.

Because such long periods are necessary for recovery, the psychologic management of patients is often as difficult as their physical treatment. The mental shock of receiving a diagnosis of tuberculosis is severe. With it come thoughts of permanent disability, a complete disruption of one's way of living, an indeterminate period of inactivity and isolation, and even death.

### *Before Admission to the Sanatorium*

Rehabilitation can be started at the time the diagnosis is made. The need for bed rest, sanatorium treatment, and isolation can be explained, and at the same time the hope of recovery can be instilled. Almost all patients will in a short time respond with a feeling of optimism and coopération. As a waiting period is usually necessary before the patient can be admitteed to a sanatorium, many of the patient's most pressing problems can be settled during this time, with the help of local agencies such as the public health and welfare departments. The care of the other members of the family can be arranged, and financial assistance worked out where it is necessary. The patient enters the sanatorium hopeful of recovery and ready to settle down and do everything possible to get well.

### *During the Period of Sanatorium Treatment*

In the sanatorium rehabilitation has often been entirely overlooked or its importance disregarded. A great deal of thought has been given to the development of sanatorium routine and to the various procedures carried out in collapse therapy, but the psychologic changes which occur during the long periods of physical inactivity have been largely disregarded.

The benefits of a program of rehabilitation are both mental and physical. Programs for education or entertainment are followed by improvement in morale. Permitting the patient some physical activity, even though limited, is evidence that improvement has taken place and that chances for recovery are greater. The patient is relieved to a great extent of the boredom of an otherwise unvaried period of inactivity.

As a tuberculous patient begins to improve, his return to health will be hastened by an increase in his physical activities. At this time his interest should be pointed either directly or indirectly toward some job objective, so that he may gain the mental assurance which comes to those with a definite capacity for earning a livelihood. The aim of treatment should not be merely to arrest the patient's disease, but also to rebuild his confidence in himself and improve his tolerance for physical activity to the point where he can do some sheltered work, take additional skilled training, or adjust to the responsibilities of a near-normal social life.

A program of rehabilitation should consist of social service, occupational therapy, education, and vocational counseling.

### *Social service*

Social service brings assistance to the patient in solving his personal problems, both social and financial. If the patient requires a long period of sanatorium treatment, arrangements which have been made for the care of his family may change and new plans may be necessary. The social worker should have a good knowledge of the patient's progress and prognosis, so that she can advise him what to expect and whether the settlement of any difficulties should be on a long- or short-term basis. This assistance with troubles at home will often prevent patients from leaving the sanatorium against advice. By interviews with the patient's family, the social worker can help them to understand his problems.

### *Occupational therapy*

Occupational therapy is any activity, either mental or physical, which is prescribed and directed for the purpose of aiding in recovery from illness. Under this definition, the scope of occupational therapy is limitless. It has special value in the treatment of tuberculous patients. For the guidance of the therapist, the patients are divided, according to the activity they are permitted, into five groups, similar to those outlined by Bobrowitz(1) and Aitken(2):

Activity 0—Absolute bed rest; no occupational therapy.
Activity 1—Absolute bed rest; reading, writing, handwork for one hour per day.
Activity 2—Bed rest except for bathroom privileges; reading, writing, handwork in bed three hours per day.
Activity 3—Limited time out of bed as prescribed; reading, writing, handwork in bed three hours per day.
Activity 4—Limited time out of bed; meals in dining room; walking exercise as prescribed, which may be taken as shop work up to one hour per day.
Activity 5—Full time up except for one and a half hours' rest in the morning and two hours' rest in the afternoon. Walking exercise as prescribed, which may be taken as work in shop up to two hours per day.

In some sanatoria, patients are kept until they are able to work four to six hours per day, and on their return home, to take regular employment. In many others, however, because of a shortage of beds they are sent home on more limited activity to make room for someone who needs sanatorium care.

The arts and crafts which are taught are almost limitless. For those in bed, there is needlework, crocheting, knitting, hand looms; in the shop there is leatherwork, woodwork, silver and many more. Some of these activities may point toward an occupational objective, while others are purely for recreation and to increase the patient's tolerance for physical activity.

### *Education*

There are in every sanatorium patients who have had their education interrupted. A well-qualified teacher can, by spending a short time with each of them every day, help them to carry on at least a part of their school work, so that they will not be so far behind when they return to school. There is also a group of patients who are illiterate. Many can be interested in learning to read and write. When they are able to read their letters from home, and can write in reply, they feel as though they have accomplished one of the greatest things possible. There are others who wish to increase their knowledge on some subject; with guidance, they can use their period of sanatorium treatment to improve their minds with something of real value. The librarian can cooperate by guiding the patient's interest toward books with educational value or with a bearing on his occupational objective, in addition to books which are purely entertaining.

### *Vocational counseling*

The vocational counselor is a person who has had special training in job placement, particularly of the handicapped. He confers with patients who are improved, and usually are on activity 4 or 5. After obtaining their occupational history, he gives them various adaptability tests to determine the type of work for which they are best suited. Then, after conference with the physician, a job objective is selected which would be within the physical abilities of the patient.

## *After Discharge*

After a patient leaves the sanatorium, a period of three to six months at home is usually required for him to become adjusted to living with his family under normal conditions. Repeated examinations are made during this time, and when he is found to be in condition to start work, he again confers with the vocational counselor. He is then started in training on his new job objective, or is placed on a job which he already knows. In some cases, of course, he may continue his education. The plan chosen for his training or work must be approved by the physician.

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1. Bobrowitz, I. D.: Vocational Therapy in the Sanatorium, Am. Rev. Tuberc. 45:400-409 (April) 1942.
2. Aitken, A. N.: (a) The Broad Scope of Occupational Therapy for the Tuberculous, read at the Annual Meeting of the Western New York Occupational Therapy Association, May 6, 1941; (b) The Rehabilitation Service of the Niagara Sanatorium, Livingston, New York, The Livingston Press, 1944.

### *Conclusion*

The complete rehabilitation program cannot always be provided by a sanatorium, but some part of it should be possible. If only one worker may be employed, he should be able to take over more than one feature of the program. In every community, there are people who are interested in giving of their time and talents to assist with such a program on a volunteer, part-time basis. They only want to know they are wanted and needed, and that there is someone at hand to guide their efforts.

The entire program of diagnosis, treatment, and rehabilitation must be well integrated, so that the therapeutic value of the various aids can be fully utilized and so that the patient does not become over-optimistic as to his progress, but is guided along as rapidly as his condition allows.

A rehabilitation program such as has been outlined has been started at the Western North Carolina Sanatorium through the assistance of the North Carolina Tuberculosis Association and the North Carolina Department of Vocational Rehabilitation. Though it is of only short duration and though all the workers needed have not yet been obtained, its value can already be seen. Fewer patients are leaving against medical advice, and there is less dissatisfaction. As it is continued, further evidence of its value will be a reduction in the number of relapses among discharged patients because of poorly chosen work.

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**The patient with tuberculosis** upon admission to a hospital becomes an individual with a broken body and disturbed mind and not just a pair of lungs sent in for repairs. The sanatorium is a place where patients' lives are carefully regulated. The rest periods are not interrupted as they would be at home by well-meaning but ill-advised friends. The X-ray equipment needed to record the course of the disease and as a guide in treatment is always at hand.—Henry D. Chadwick, M.D. and Alton S. Pope, M.D.; The Modern Attack on Tuberculosis, The Commonwealth Fund, Revised, 1946.

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**For over sixty years** it has been known that the tubercle bacillus is the cause of tuberculosis, and that it should be looked for in the sputum of patients with respiratory infections has become axiomatic. Notwithstanding this common knowledge, physicians very often lose valuable time treating tuberculous patients for colds, bronchitis, or asthma, and they may even have tonsils removed because of cough before a specimen of sputum is examined for tubercle bacilli.—Henry D. Chadwick, M.D. and Alton S. Pope, M.D.: The Modern Attack on Tuberculosis, The Commonwealth Fund, Revised, 1946.

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## THE SEQUELAE OF PULMONARY TUBERCULOSIS

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Chicago

One of the great paradoxes of medicine is the fact that healing and regeneration are not infrequently responsible for disease conditions which are as bad as the original ailment, or worse. The injury due to the regeneration depends largely upon the location of the process. When fibrous tissue forms on surfaces, it generally produces only puckered scars; but when it forms in ducts, in narrow passages, or on enclosed spaces, it frequently obstructs nature's vital processes. This principle may be illustrated by the effect of the streptococcus or other toxic agents on the kidneys; the destruction of glomeruli and tubules is followed by fibrous contraction, and later by insufficiency and edema. An infection located on the heart valves produces as a late sequel fibrous contraction (stenosis), which may go to the point of hindering the flow of blood. Other common effects of fibrous contraction are tabes dorsalis, liver cirrhosis, optic atrophy, pyloric obstruction, and urethral stricture.

There are many other disease conditions due to fibrous contraction, not the least of which are many sequelae of healed and healing tuberculosis. It seems logical to assume that, just as many tuberculous infections have been overlooked in the past, so also the sequelae of such infections have been overlooked or not even suspected. Many times the condition has been attributed to some other disease process, and the primary remote cause not considered. The purpose of this discourse is to bring into sharper focus a few of the important sequelae of tuberculosis.

For many reasons the discussion will be restricted to those conditions within the chest. Many others could be described in other parts of the body, but there is not time to do more than merely mention important ones, such as Addison's disease, ankylosis of the various joints with distortion and shortening, tuberculous cirrhosis of the liver, certain types of ulcerative colitis, the fibroid or "lead pipe" colon, and the "autonephrectomy."

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From the Research Laboratories of the City of Chicago Municipal Tuberculosis Sanitarium.

The exact incidence of the sequelae of pulmonary tuberculosis is not known. Each of the sequelae to be discussed has been found several times in a series of about 2300 autopsies. The last condition which I shall discuss (bullous emphysema with cardiac embarrassment) is represented by about 10 cases, or 0.5 per cent of all cases coming to autopsy. Probably the greater number of these cases are found in general hospitals, because all evidence of tuberculosis has disappeared before the final illness. Korol(1) estimated that 30 per cent of the veterans of World War I who are in Veterans Hospitals because of pulmonary disease have bullous emphysema of the upper lobe. Probably not all cases of bullous emphysema are due to chronic tuberculosis, because Sweany, Levinson, and Stadnichenko(2) found bullous emphysema in the lungs of 4 per cent of adult patients dying from causes other than tuberculosis. It is certain, however, that a high percentage of the cases of bullous emphysema follow an advanced healing tuberculosis, and that some of these patients develop a right-sided heart failure.

The most important groups of late sequelae that arise within the chest include those involving the pleura, the blood vessels, the lymphatics, the bronchi, and, most important of all, the lung parenchyma.

### *Sequelae Involving the Pleura*

The effects of pleuritis are largely those of a distortion due to contraction. Sometimes the fibroid pleuritis is due to organization of effusions, which compresses the lung tissue and leads to mechanical atelectasis. When bilateral, this condition produces serious respiratory embarrassment. It may also cause a pull on the heart and vessels that disturbs the circulation. Practically always there is pressure on nerves within the pleura — sometimes on the intercostal nerves — which may lead to pain and discomfort. Often the sympathetic and vagus nerves are entrapped in fibrous tissue; this condition is painful and produces a deranged respiratory physiology.

### *Sequelae Involving the Blood Vessels*

Disturbance of the pulmonary vessels may be of several types. Destruction of the bronchial arteries is frequent and produces a poorly nourished lung, which leads to a weakening of elastic tissue and resulting emphysema or bronchiectasis. The pulmonary arteries and veins may be closed by fibrosis or thrombosis, or they may be buckled in a way that shuts off or restricts the circulation.

### *Sequelae Involving the Lymph Nodes*

The lymph nodes are important primarily because of the pressure they may exert on the bronchi, thus leading to an atelectasis of the lobules or lobes of the lung. Along with the mechanical pressure, the tuberculous foci produce a toxic effect that radiates into the perivascular spaces and bronchial wall, producing first inflammation and effusion, then subacute and chronic changes that result in fibrosis. The peribronchial and interstitial fibrosis contracts upon healing, causing bronchial stenosis.

An illustration of a "chain reaction" due primarily to enlarged bronchial lymph nodes will be appropriate.

#### Case 1

The patient was an American woman who was 19 years old at the time of death. There was nothing unusual in the history.

A roentgenogram taken on admission showed a dense shadow along the spine, about 2 cm. broad, extending from the apex to the hilum (lobitis). There were infiltrative areas characteristic of tuberculosis in the upper parts of both lungs. Pneumothorax was attempted without success. The sputum was positive for tuberculosis.

At the postmortem examination an atelectatic left upper lobe was found and recent solid masses were seen throughout the left lower and the right upper lobes. There were scattered acinous, nodose lesions in the lower parts of the right lung. Sagittal section showed a dry, spongy left upper lobe and tuberculous masses, cavities, and nodules elsewhere throughout the rest of the lungs. Forming a ring around the main upper lobe bronchus were three calcified tubercles 5 to 7 mm. in diameter. The lumen was narrowed to about half the normal size.

There was a mild degree of bronchiectasis in the principal bronchi of this lobe. Several calcified foci were scattered throughout the lobe, with the largest one, about 5 mm. in diameter, in the apex. The lung parenchyma was dry and spongy, with no caseation or consolidation, and with only a slight amount of fibrosis.

The microscopic sections revealed that all the calcifications had a uniform age character, consisting of a small central calcified core and an early specific capsule of moderate thickness. The oldest tubercles corresponded to a four- or five-year process. The parenchyma of the collapsed lobe showed a rather uniform atelectasis with occasional nodular tubercles, some of which had calcified centers. The bronchi at the level of the lymph nodes consisted of a ring of fibrosis extending in from the lymph node tubercles

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1. Korol, E.: Pulmonary Emphysema in Tuberculosis, Am. Rev. Tuberc. 38:594-605 (Nov.) 1938.
2. Sweany, H. C., Levinson, S. A., and Stadnichenko, A. M. S.: Tuberculous Infection in People Dying of Causes Other than Tuberculosis, Am. Rev. Tuberc. 48:131-173 (Sept.) 1943.

towards the lumen. This case has been reported previously(3).

Calcified lymph node tubercles (pneumoliths) may rupture into a bronchus, causing hemorrhage, obstruction, and sometimes atelectasis. In one instance an occlusion, atelectasis, and abscess resulted from the discharge of a "lung stone" into a main bronchus. Symptoms disappeared after removal of the foreign body by the bronchoscope.

### *Sequelae Involving the Bronchi*

Permanent stenosis of bronchi resulting from tuberculous ulceration of the mucosa is responsible for many signs and symptoms. The principal signs are cough, dyspnea, wheezing, and intermittent fever and expectoration. Eloesser(4), Samson(5), and Barnwell, Littig and Culp(6), among others, have described the complication. The clinical result is the same as in the last case, but the origin of the process is different, as the next report will show.

**Case 2**

The patient was an American woman of Norwegian extraction. Two other sisters had died of tuberculosis. Her mother died of "pneumonia" when the patient was 3 years old. The patient had tuberculous cervical lymph nodes, which drained when she was 12 years of age. Her illness began in July, 1931, as a cold. She was treated for bronchitis, then for "unresolved pneumonia" (atelectasis); finally a diagnosis of pulmonary tuberculosis was made. Cough and dyspnea were present at intervals.

The pertinent physical findings were numerous. Perhaps the most characteristic were sonorous rales over the upper lobes on normal breathing, with coarse moist rales after cough. The roentgenographic examination revealed a consolidation of the right upper lobe, with enlargement of the hilum. The sputum was positive for tubercle bacilli. A diagnosis of tuberculosis, far advanced—B, with "asthmatic bronchitis" was made.

The patient became progressively worse and the rales became more "musical" in character. She died in January, 1933.

The important postmortem observation, in addition to far advanced tuberculosis and the old cervical and hilar calcified lymph nodes, were deep, healed craters in the right main bronchus and on the right side of the trachea, with fibrous bands which narrowed the lumen at many places along the bronchus.

It is probable that an ulcerative bronchitis caused the bronchial occlusion, although the possibility that enlarged lymph nodes played a subsidiary role cannot be overlooked.

Another serious sequellar disease affecting the bronchi is bronchiectasis. There are two main theories concerning the origin of bronchiectasis—"pulsion" and "traction," both of which are anatomically demonstrable. Bronchiectasis involves practically every bronchus leading from a tuberculous focus, but only in chronic or healed disease does it cause symptoms.

Miller and Wallgren(7), Simon(8), Blumenberg(9), Bernard(10), and Jones, Peck, and Willis(11) describe the bronchiectasis which follows the *"healed,"* primary infection. A primary lesion always produces emphysema and damage to the bronchi in the region around it, and sometimes leads to dilatation. Sometimes a later nonspecific infection supervenes.

A case report will illustrate a permanent nonspecific infection superimposed on an old tuberculous bronchiectasis.

**Case 3**

This Negro girl was 19 years old at the time of death. Her mother was reported to have had "asthma" for six years. The patient had "pneumonia" in childhood. She was apparently well until April, 1931, when she developed a cough. A school physician made the diagnosis of tuberculosis. The most important features of her case were the postmortem findings.

There were numerous bronchiectatic cavities in the whole right upper lobe. This process was in direct anatomic relation to primary calcified lymph nodes at the hilum and along the right side of the trachea. It was a bronchiectasis following a massive healed primary infection. The sputum was negative for tubercle bacilli while the patient was under observation, and no specific lesions could be found at autopsy.

The incidence of bronchiectasis following secondary tuberculosis is even greater than that which results from the healing of primary lesions. Simon(8) says that the part played by advanced tuberculosis in producing bronchiectasis is well known.

### *Sequelae Involving the Pulmonary Parenchyma*

The pulmonary parenchyma may be involved in several different disease conditions. Atelectasis, or a collapse of the pulmonary alveoli, will be mentioned first. One of the first to recognize this condition clinically was Bernard(10), who described consolidations of

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3. Sweany, H. C.: Age Morphology of Primary Tubercles, Springfield, Illinois, Charles C. Thomas, 1941.
4. Eloesser, L.: Bronchial Stenosis in Pulmonary Tuberculosis, with Some Notes on Tuberculous Stenosis of the Trachea and Bronchioles, Am. Rev. Tuberc. 30:123-180 (Aug.) 1934.
5. Samson, P. C.: Diagnosis, Treatment and Prognosis in Tuberculous Tracheobronchitis, J. Thoracic Surg. 6:561-582 (June) 1937.
6. Barnwell, J. B., Littig, J., and Culp, J. E.: Ulcerative Tuberculous Tracheobronchitis, Am. Rev. Tuberc. 36:8-45 (July) 1937.
7. Miller, J. A., and Wallgren, A.: Pulmonary Tuberculosis in Adults and Children, New York, Thomas Nelson & Sons, 1939.
8. Simon, G.: Ueber typische fruehe tuberkulœse Lungenspitzen herde bei Kindern. Ztschr. f. Tuberk. 42:353-363, 1925.
9. Blumenberg, W.: Die Tuberkulose des Menschen in den verschiedenen Lebensaltern, Beitr. z. Klin. d. Tuberk. 62:532, 1925; 63:13-59, 1926.
10. Bernard, L.: Les Debuts et Les Arrets de la Tuberculose Pulmonaire, Paris, Masson et Cie, 1931.
11. Jones, E. M., Peck, W. M., and Willis, H. S.: Bronchiectasis Following Primary Tuberculosis, Am. J. Dis. Child. 72:296-309 (Sept.) 1946.

the upper lobe as "lobite," or lobitis. It may be due to blocking of bronchi by lymph nodes or fibrous tissue, as in case 1. It may be due to external pressure, to fibrous tissue, or to operative procedures which force air out mechanically. It may be purely regional, resulting from a primary or re-infection tuberculosis.

Undoubtedly the most important sequel of pulmonary tuberculosis is the emphysema of healing which many times advances to a "cystic" lung. This type of cystic lung is not to be confused with the congenital variety; actually it amounts to an extreme degree of bullous emphysema. This condition results from destruction of the elastic fibers of the lung by toxic, nutritional, and mechanical causes. The interference with nutrition follows an endarteritis or destruction of the pulmonary arterioles(12) and bronchial arteries(13). The result is a debilitating anemia which may be demonstrated by angiopneumography. According to Korol(1), collateral circulation by way of adhesions helps to reverse a developing emphysema.

In tuberculosis practically all of the above mentioned causes of emphysema may be present. The toxic effect of the tubercle bacillus is aided by injury, destruction, or stretching of the arterioles and arteries, and finally, as the disease advances, by a direct distention of alveoli due to the compensatory effort or to the positive pressure of the air trapped in distended alveoli.

The mechanism of the process is difficult to follow except by painstaking histopathologic techniques. In our studies we have used the third-dimension method so well employed by Miller(14) in his work on lung anatomy. By this method we have found that the same contraction that takes place in the larger bronchi(15) also takes place in the smaller ones. Small valvular mechanisms develop. After a time a great many bronchioles are cut off entirely, leaving blind sacs of trapped air. When the openings are completely stopped, local atelectasis results. Usually the process gradually stretches the alveoli until there appear openings between the alveoli which are said to begin in the much disputed Kohn pores. The distention continues until the respiratory and larger bronchioles are involved. The walls of all structures disappear, and thin threads remain like the ropes supporting a tent. These finally break one by one, until nothing is left in a whole segment of a lobe but a large bulla with threads in the cavity. If this condition involves a whole lobe or lung, it becomes a "cystic" lung. The pathogenesis of advanced emphysema and of this type of cystic lung is essentially the same.

A case of a patient with an old healed lesion will illustrate an uncomplicated emphysematous process.

### Case 4

This patient, a white male who was 61 years old at death, had no family history of tuberculosis. He had pneumonia at 16 years of age, and influenza at the age of 43. The onset of his disease was insidious, seven years before death. At the time of his entry there was a huge cavity in the left upper lobe that increased very little in size during the seven years. His sputum was positive for tuberculosis.

At autopsy there was found a large, ossified primary lesion in the left base, surrounded by a large area of emphysema filling almost all the lobe. A large, multiple calcified complex was seen at the hilum. This process probably was many decades old.

Another case will be cited to illustrate the occurrence of acute infection and edema in a healed, secondary tuberculous lesion.

### Case 5

An American woman of Swedish extraction was exposed to a sister who had tuberculosis. Her illness began with an attack of influenza. She continued to work, but finally lost weight, became fatigued, and was told that she had "weak lungs."

There was a bilateral nodular apical tuberculosis that gradually underwent calcification. She came into the Sanitarium, and after seven years her disease was pronounced apparently arrested. The lesions finally became densely calcified. A duodenal ulcer developed during her stay in the hospital. After leaving the hospital, she had a bout of vomiting, and the right upper lobe of the lung became so filled with moisture that a gastroenterologist made a diagnosis of tuberculosis. After three weeks of rest and treatment of the ulcer the rales disappeared and the patient returned to normal health. Apparently the rales were due to edema which developed in the emphysematous lung as a result of protracted vomiting. As soon as the equilibrium was restored, the edema disappeared.

The patient has had no return of pulmonary symptoms.

Occasionally an abscess is superimposed upon damaged lung tissue. Among the organisms responsible for such abscesses which have been found in our institution are streptococci, Friedländer's bacillus, fusospirochetes, Welch's bacillus, Bacillus pyocyaneus, and the colon bacillus.

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12. Isaaksson: Pathologisch-anatomische Verænderungen der Lungengefæsse bei Emphysem. Virchows Arch. f. path. Anat. 53:466-469, 1871.
13. Loeschcke, H.: Das Lungenemphysem, in Henke, F. and Lubarsch, O.: Handbuch der spez. path. Anat. und Histologie. Berlin. J. Springer, 1928. Vol. 3, part I, pp. 612-689.
14. Miller, W. S.: The Lung, Springfield, Illinois, Charles C. Thomas, 1937.
15. (a) Spivek, M. L.: Obstructive Pulmonary Emphysema Due to Partial Obstruction of the Bronchi by Tuberculous Lesions, Am. J. Dis. Child. 51:69-83 (Jan.) 1936; (b) Faust, O. A.: Primary Tuberculosis, Obstructive Pulmonary Emphysema and Asthma with Recovery, Am. J. Dis. Child. 51:118-122 (Jan.) 1936.

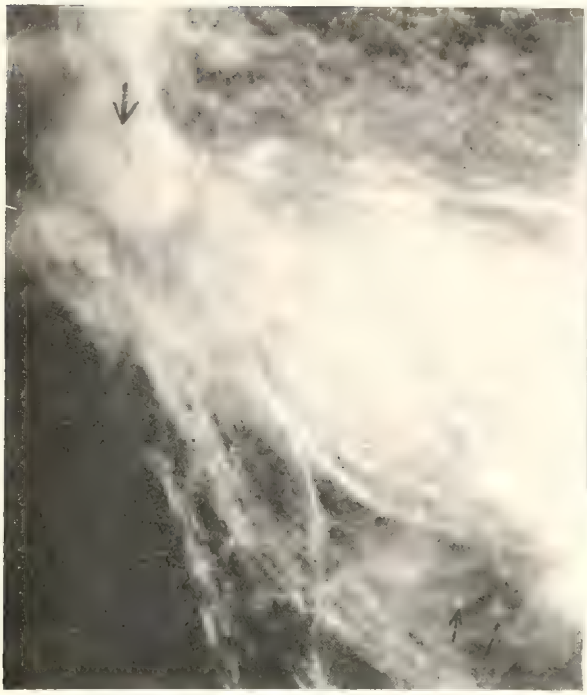

Fig. 1 (Case 4). A postmortem roentgenogram of the left lower part of the hilar region, with much of the lower lobe showing. Note the large calcified lesions in the middle of the lobe and the stringy fibrosis throughout.

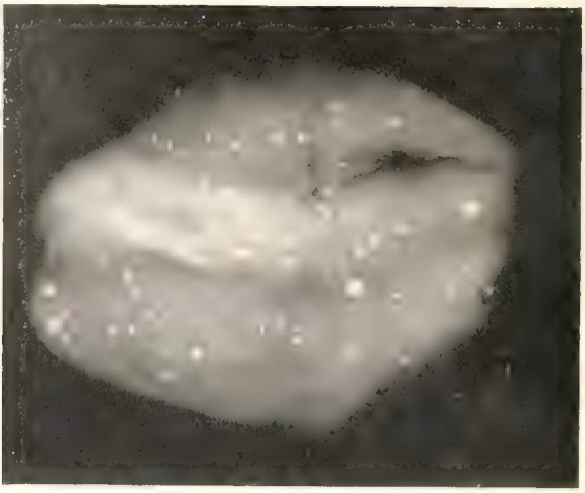

Fig. 2 (Case 4). A postmortem roentgenogram of the spleen, showing old multiple calcifications resulting from the hematogenous dissemination of the primary lesion.

**Case 6**

The patient was an American girl of Italian extraction, who was 24 years old at death. There was no known tuberculosis in the family and her own history was negative until 1929, when she had a hemorrhage. She went to the dispensary, but no diagnosis was made. She received pneumothorax in the Fresh Air Hospital, Chicago. She was admitted to the Sanitarium as a moderately advanced-B case on the basis of x-ray appearances. No tubercle bacilli were ever found in her sputum, but Bacillus pyocyaneus was always present.

She was given sanocrysin treatment, which produced a severe reaction. After this she failed rapidly and died.

The postmortem findings in the lungs were as follows: Multiple calcified primary lesions were present in the right upper and middle lobes, and there was a large calcified complex at the hilum. Evidence of collapse of the right lung, especially the upper lobe, was seen; the parietal pleura was thick and consisted of dense hyaline fibrous tissue. There was an abscess condition, apparently nontuberculous, in the middle and the right upper lobes; this seemed to be a terminal abscess on an old primary tuberculosis.

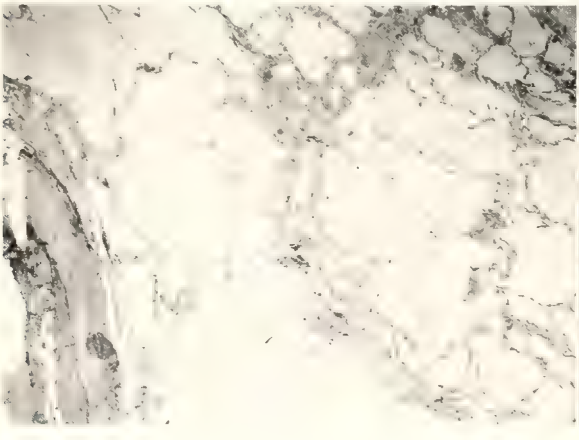

Fig. 3 (Case 4). A microscopic photograph showing a part of the old calcified parenchymal lesion seen in figure 1. Note the bone and marrow on the inner margin, and the marked emphysema alternating with fibrosis.

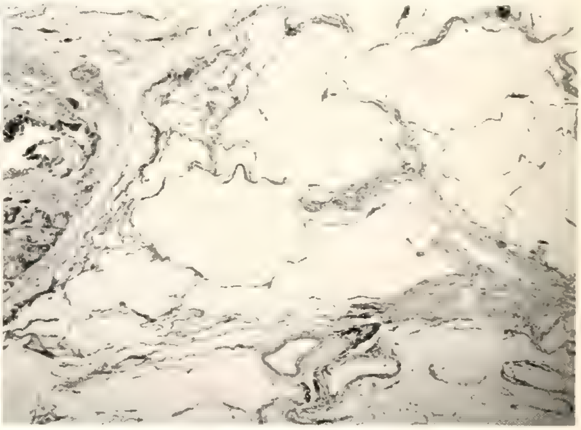

Fig. 4. A similar section several centimeters out from the calcification showing essentially the same pathology.

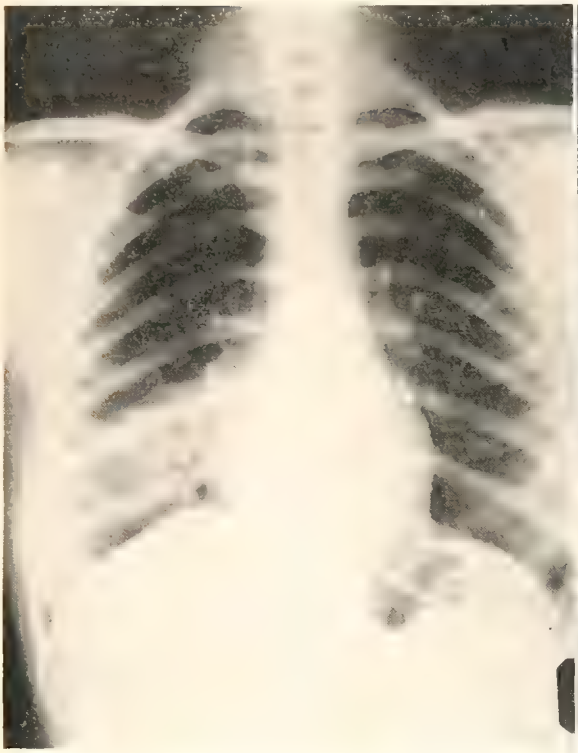

**Fig. 5 (Case 6). An antemortem roentgenogram showing atelectasis in the right lower lobe.**

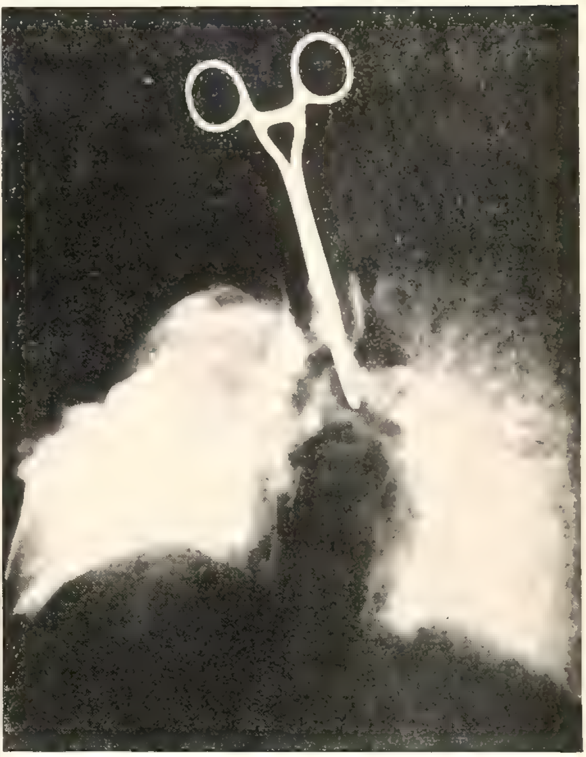

**Fig. 6. A postmortem roentgenogram of the same case.**

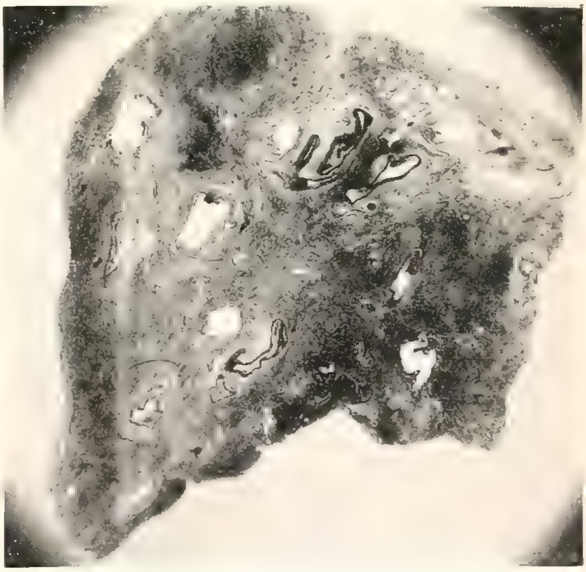

**Fig. 7 (Case 6). A photograph of a cross section of the lower lobe of the lung, showing atelectasis and fibrosis.**

The sanocrysin apparently initiated the fatal symptoms.

While emphysema is present in practically any healed tuberculous lesion, only the extensive lesions produce severe symptoms. Most fibroid types result in advanced emphysema, but only a few go far enough to cause cardiac damage. It is probable, however, that in many patients who end up in general hospitals with heart disease due to the emphysema of healed tuberculosis, the remote cause of their heart condition is never recognized. The percentage of such cases would be hard to estimate.

As the functioning alveoli are gradually destroyed in the emphysema process, the pulmonary circuit is finally narrowed to such an extent that a gradually increasing pulmonary pressure is necessary to force the blood through the lungs. Thus a burden is thrown on the heart. The right side of the heart in particular is affected, and soon begins to enlarge. Visscher(16) has shown that this is a serious and rapidly progressive condition. As his experiments show, ". . . when the pulmonary pressure rises, thus restricting the thebesian flow, the oxygen content of the thebesian venous blood becomes consistently less than that of the coronary sinus blood." The right side of the heart is thus relatively anoxic, and a dangerous and rapidly fatal cycle is set up. Clinically, the patient is dyspneic, sometimes cyanotic. The x-ray re-

16. Visscher, M. B.: The Restriction of the Coronary Flow as a General Factor in Heart Failure, J.A.M.A. 113:987-990 (Sept. 9) 1939.

veals an enlarged heart and fibrous apices of the lungs, with emphysema; lipiodol reveals extensive bronchiectasis. The electrocardiogram shows a tremendous right heart preponderance, with a gradually increasing arrhythmia as the disease progresses. The process is almost identical with that in advanced silicosis(17).

Three typical cases will be presented.

### Case 7

F.H.C. was an Englishman, 59 years old when he died in 1938. He had been a railway clerk for 38 years. A fistula of twenty years' duration was removed in 1926. His pulmonary symptoms began in 1929. His usual weight was 124 pounds. During the last year of life he was dyspneic on moderate exertion.

The physical findings were principally those of a fibroid tuberculosis and a damaged heart. The patient's general development and general condition were fair; his skin was clear; the fingers were clubbed. The heart boundaries were within normal limits, but there were loud systolic and presystolic murmurs at the apex, and a presystolic thrill. The blood pressure was 140 systolic, 76 diastolic. Examination of the chest showed impaired expansion bilaterally and dullness over the upper third bilaterally. On the right there were varied rales and harsh breath sounds, with increased whispered voice in the upper half. The left side showed similar findings. The diagnosis was far-advanced pulmonary tuberculosis with multiple cavities bilaterally.

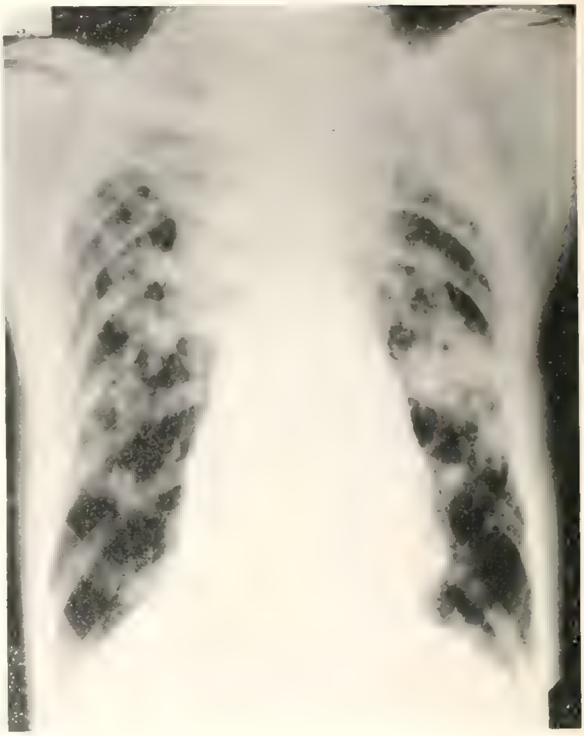

Fig. 8 (Case 7). An antemortem roentgenogram, showing fibroid apices, marked emphysema at both bases, and a tremendous enlargement of the heart.

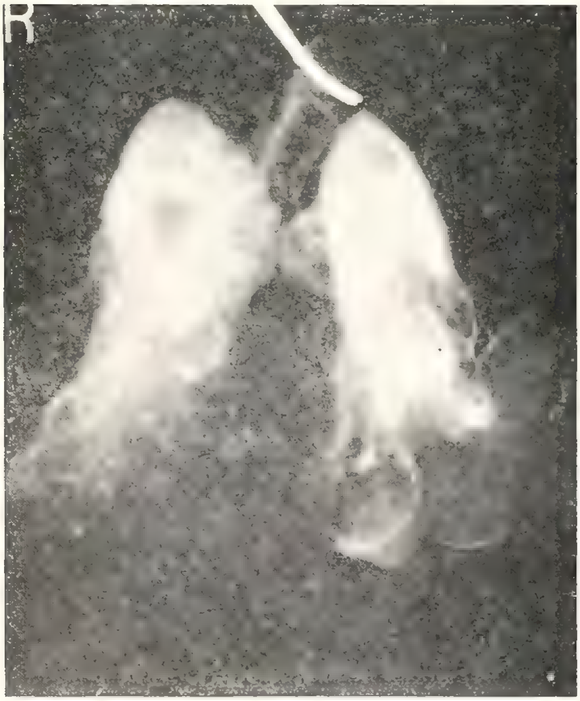

Fig. 9 (Case 7). A postmortem roentgenogram of the lung, showing fibrocaseous apices with bullae at both bases.

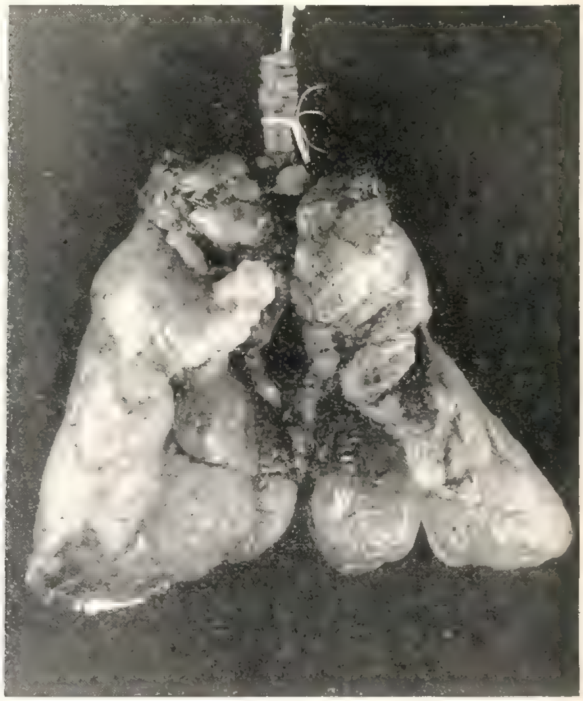

Fig. 10. An inflated and dried specimen showing the gross appearance of the lung. No microscopic sections were taken of this specimen.

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17. (a) Sweany, H. C., Porsche, J. D., and Douglass, J. R.: Chemical and Pathologic Study of Pneumonoconiosis, with Special Emphasis on Silicosis and Silicotuberculosis, Arch. Path. 22:593-633 (Nov.) 1936; (b) Kinney, W. M.: The Pathology of Silicosis and Silicotuberculosis, J. Missouri M.A. 33:257-260 (July) 1936.

The electrocardiogram showed the rate to be 110, the rhythm irregular on account of extrasystoles; $QRS_1$, $_2$, and $_3$ were slurred; $QRS_1$ was low; $S\text{-}T_2$ and $_3$ were depressed. The diagnosis was myocardial damage and auricular premature contractions.

Stereoroentgenographic examination of the chest showed that the apices were both very hazy, the diaphragms were oblique, and the costophrenic angles were both obliterated. The cardiac shadow was enormously enlarged both to the right and to the left. There was an infiltration of both upper fields, characteristic of tuberculosis, and a marked emphysema at the bases.

No tubercle bacilli were ever found while this patient was under observation here.

The postmortem examination revealed scattered calcifications in both upper lobes up to 6 mm. in diameter. The bronchopulmonary nodes showed calcifications up to 4 mm. in diameter. There was a fibroid, 3-cm. cavity in the left upper lobe, with scattered acinous nodose and patchy pneumonic foci throughout both lungs. Extremely large bullae, up to 10 cm. in size, were seen along the diaphragmatic and anterior margins. There were no specific lesions of tuberculosis.

The heart weighed 415 Gm. All the chambers were dilated. The left ventricular wall measured 13 mm., and **the right ventricular wall measured 9 mm. in thickness.**

Other pathologic changes were not pertinent to this discussion.

### Case 8

W.F. was a Bohemian, 65 years of age at the time of death. He came to the United States at the age of 17. There was no history of tuberculosis in the family, but his father died of pneumonia. The patient's disease manifested itself at the age of 43, with hemorrhage. He had had much dyspnea ever since.

The physical examination revealed a flaring outward of the lower costal borders; retraction of the clavicular spaces; impairment of resonance over the upper lobes, with an increase in resonance over the lowers; a few rales at the bases; and an increase in whispered voice sounds over both upper lobes.

The sputum was negative for tubercle bacilli.

The x-ray revealed fibrosis of the apices and enlargement of the heart.

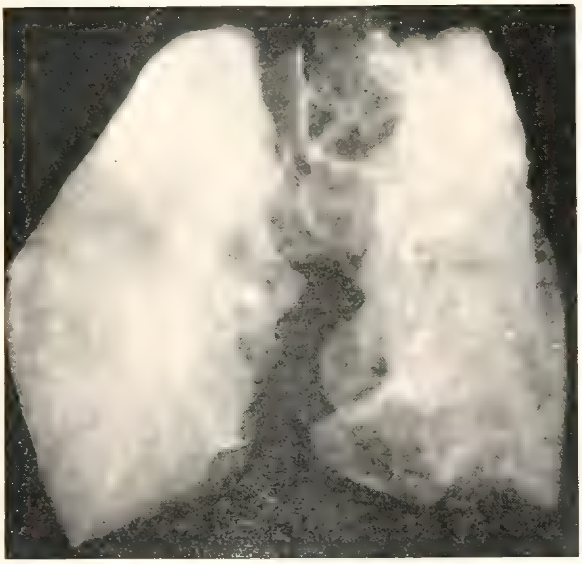

**Fig. 11 (Case 8). A postmortem roentgenogram showing much the same pathology as in case 7. Note the many calcifications in both upper lobes.**

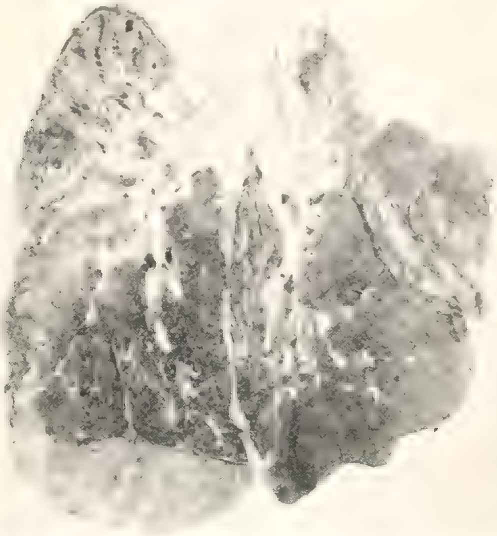

**Fig. 12 (Case 8). A sagittal section showing bronchiectasis in both upper lobes and emphysema in both bases.**

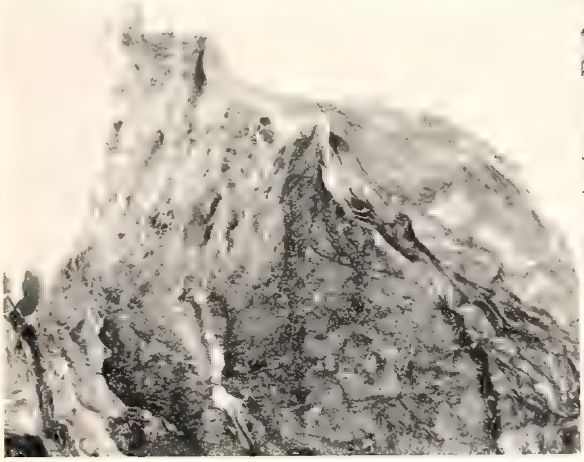

**Fig. 13 (Case 8). A photograph of the lung margin. Note the "dishrag" appearance.**

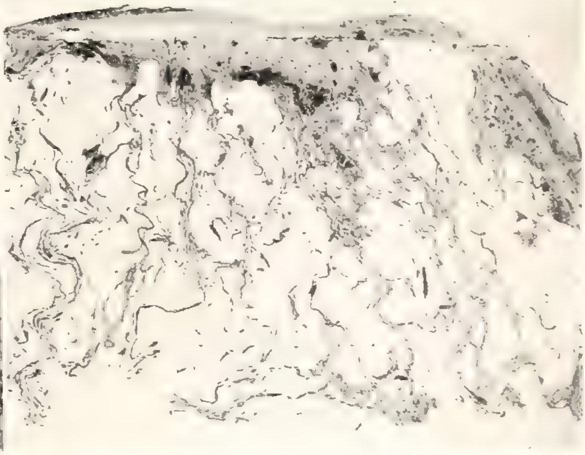

**Fig. 14 (Case 8). A microscopic section of the lung, showing the marked emphysema.**

At postmortem examination the heart was found to weigh 435 Gm.; the wall of the right ventricle measured 6 mm. in thickness; that of the left 17 mm. In the lungs were old contracted cavities, with bronchiectasis in both upper lobes, and an extreme degree of emphysema in both bases. Some huge bullae were present. Old primary lesions were seen, the largest in the right base. Microscopically, there was no evidence of tuberculosis; in fact, no specific lesions could be found at all. There was an extreme degree of emphysema.

### Case 9

R.R. was an American, 47 years old at death. There was no history of tuberculosis in the family.

The patient stated that he had had bronchitis most of his life, with wheezing in his chest. His fatal illness began in 1936, as a cough, one year before death. Since 1908 he had been under observation for lung trouble, but no tubercle bacilli had ever been found.

The clinical examination revealed a lag at the right base with almost complete absence of breath sounds, but no impairment of resonance. There were sonorous rales at the right apex and scattered fine rales in the left base. The heart was much enlarged and showed signs of decompensation.

The electrocardiogram showed evidence of damage to the right side of the heart, and right ventricular preponderance. The diagnosis was myocardial damage and chronic cor pulmonale due to asthma, emphysema, or fibroid tuberculosis.

The postmortem examination showed that the right lower lobe was converted into a dishrag-like tissue with bullous emphysema at the margins. An old calcification 5 mm. in diameter was seen in the center of this lobe. The remaining lung was of rubbery consistency, and subcrepitant. The lymph nodes were anthracotic and not enlarged. The left lung was emphysematous throughout, with small bullae on the margins.

The heart weighed 425 Gm. The left ventricle was 17 mm. and **the right 9 mm. in thickness.**

This case represented an old extinct primary tuberculosis, followed by a reinfection process with complete healing, then slow development of a progressive emphysema and ultimate cardiac failure. The main point is that the tuberculous infection occurred in early life and that the sequelae developed only by a slow "attrition" of the lung tissue.

### *Summary*

In summarizing the various conditions presented, it may be pointed out that any infection causes damage to tissue and that any healing of this damage forms scar tissue. On external surfaces this scar tissue does little harm. In the pleura it may lead to compression atelectasis. In narrow passages it causes strictures and stenoses that interfere with the normal physiology. As a result of some of these changes, vicious cycles are set up that bring mechanical factors to bear upon the normal physiology, producing a pathologic physiology.

Inasmuch as tuberculosis is still one of the most common lung diseases, it forms the groundwork for the development of a significant percentage of such diseases as atelectasis, bronchiectasis, and emphysema, as well as terminal cardiac failure.

Tuberculosis of the bronchi causes ulcers which form scar tissue as they heal. This scar tissue contracts for months after forming, so that the lumen is narrowed and atelectasis and symptoms of dyspnea result. Bronchiectasis may develop later if the stricture is not removed. Narrowing of bronchi by enlarged lymph nodes may produce the same result.

Following most primary infections and practically all healing reinfections, bronchiectasis, atelectasis, and emphysema result from destruction of the elastic tissue of the lungs and bronchi. These conditions are usually progressive and may not become troublesome until many years after the original disease has healed. During the wear and tear of life, the limited active alveolar reserve gradually becomes destroyed, and eventually a terminal dyspnea sets in. Finally, strain on the heart becomes so great that death frequently results from right-sided heart failure.

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# THE DEVELOPMENT OF THE TUBERCULOSIS CASE-FINDING PROGRAM IN NORTH CAROLINA

Herman F. Easom, M.D., F.A.C.P.
Wilson

Early diagnosis of tuberculosis has long been recognized as one of the most important factors in any good tuberculosis control program. It has been stressed continually by the National Tuberculosis Association, state tuberculosis associations, sanatoria, health departments, and all other groups actively interested in the problem of tuberculosis control.

### *Establishment of the Extension Department of the North Carolina Sanatorium*

North Carolina may justly be proud of its record in this field. The North Carolina Sanatorium had been established only a few years when Dr. L. B. McBrayer, superintendent, and Dr. Paul P. McCain, assistant superintendent, realized that some kind of public case-finding program was needed to increase the number of cases discovered early, and to prevent in every way possible the spread of the disease by patients with active cases. In 1914 they requested the State Legislature to appropriate $10,000 for the establishment of an Extension Department of the North Carolina Sanatorium. This request was granted[1].

From 1914 to 1919 the Extension Department carried on an educational campaign by means of talks, conferences, and the distribution of literature on tuberculosis; sputum cups and all other supplies needed by a patient with an active case at home were sold at cost, and an outpatient diagnostic clinic was established in the sanatorium in 1915. During the first year only 232 patients were examined, but the next year 411 were seen[2]. This service proved very popular, and the volume of work in the clinic increased steadily, until in 1919 a total of 909 persons were examined[3].

### *County Clinics*

The North Carolina Tuberculosis Association also became interested in case-finding, and in 1919 they employed a clinic physician who was to work out of the North Carolina Sanatorium in cooperation with the Extension Department. According to the report for that year, he conducted two county clinics and also helped in the outpatient clinic. The idea of county clinics caught on quickly, and more and more requests came in for the services of the clinic physician.

In January, 1924, Dr. L. B. McBrayer resigned as superintendent of the North Carolina Sanatorium, and Dr. Paul P. McCain, who had served as assistant superintendent for several years, was appointed to succeed him. Dr. McCain was deeply interested in all phases of tuberculosis work, and particularly in the work of the Extension Department. Soon after he became superintendent, arrangements were made for the Extension Department to take over the work of the diagnostic clinics which previously had been sponsored by the North Carolina Tuberculosis Association[4]. By that time the demand for clinics had become so great that it was necessary to employ a second full-time clinic physician. In 1925 these two doctors examined a total of 3,622 persons and found 862 new cases of tuberculosis[5].

County clinics were held only upon request, and this usually came from the county health department and the county medical society. The coming of the clinic was publicized well in advance, and the schedule of appointments was made by the local health department. Physicians were first invited to submit the names of any persons they wished to have examined. Then appointments were given to former sanatorium patients, to contacts of active cases, to persons having suspicious symptoms, to food-handlers, and, finally, to anyone else desiring an examination. The clinic usually lasted one or two weeks, and in some counties was held regularly each year.

### *Sanatorium Sun*

In March, 1926, the Extension Department began publication of *The Sanatorium Sun*[6], a monthly paper carrying articles on tuberculosis suitable for patients and the general public, news items concerning patients and staff, and a list of the most common symptoms of tuberculosis. Every patient receives the paper free while in the hospital and for one year afterward, after which the subscription price is only twenty-five cents a year. This paper has been a means of spreading sound information where it was most needed —namely, to patients and their relatives—and it has, no doubt, influenced many persons to seek examination who would otherwise not have done so. It has also helped to educate patients in regard to precautions against reactivation of their disease after leaving the sanatorium.

During the year 1926 a Negro health worker was employed jointly by the Extension Department and the North Carolina Tuberculosis Association[7]. It was hoped through her to reach thousands of Negroes with helpful facts about tuberculosis.

### *School Clinics*

In 1926 an increase to $20,000 in the appropriation for the Extension Department made possible the beginning of school clinics, which proved to be one of the finest educational programs ever put on in this state. They were conducted upon request, usually from the local health department or county medical society. A clinic physician was sent

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1. Second Annual Report of the North Carolina Sanatorium, 1915, p. 19.
2. Third Annual Report of the North Carolina Sanatorium, 1916, p. 7.
3. Sixth Annual Report of the North Carolina Sanatorium, 1919, p. 20.
4. Eleventh Annual Report of the North Carolina Sanatorium, 1924, p. 11.
5. Twelfth Annual Report of the North Carolina Sanatorium, 1925, p. 14.
6. Thirteenth Annual Report of the North Carolina Sanatorium, 1926, p. 10.
7. Twelfth Annual Report of the North Carolina Sanatorium, 1925, p. 11.

to the county, and with the assistance of the public health nurse he gave skin tests to all grammar-school children who had their parents' permission. A 1:1000 dilution of Koch's old tuberculin was used routinely; 0.1 cc. was given intradermally, and the result was read at forty-eight hours. Teachers also were encouraged to take the test. Negative reactors were excused from further examination. Positive reactors were given a rather complete physical examination. After all skin tests and physical examinations had been completed in a county, the x-ray technician from the North Carolina Sanatorium came in and made anteroposterior and oblique films on all positive reactors. These were processed and interpreted at the North Carolina Sanatorium, and the reports were sent to the local health department.

The yield of active cases in school clinics was extremely low, but the educational value of the clinics was more than enough to make them worth while. A positive skin test on a child immediately attracted the parents' interest in a way that no amount of literature could have done. Then the parents were in a very receptive mood for more information on the subject of tuberculosis, and usually were quite willing to have the entire family examined in an effort to discover the source of the child's infection. These examinations often led to the discovery of unknown cases of active reinfection-type disease. As long as he was in the county, the clinic physician was available for talks before interested groups and for consultation on individual cases.

In some places the school clinics were directly responsible for the establishment of summer preventoria for undernourished positive reactors. These, in addition to being beneficial to the children, tended to focus the attention of the community on the importance of the tuberculosis program.

These school clinics proved very popular, and Dr. McCain found it necessary in 1929 to add a third clinic physician to take care of the ever-increasing demand for children's clinics, adult clinics, and examinations in the outpatient clinic. During that year 24,231 children were tested, of whom 12.07 per cent reacted positively and 1.62 per cent were found to show x-ray evidence of tuberculosis, usually of the healed primary type(8). In 1929 2,439(9) persons were examined in the outpatient clinic at the North Carolina Sanatorium, and 1,881 in the county adult clinics held during the summer months(10). School clinics were extended that year to include high-school students, because it was recognized that reinfection-type disease was more likely to develop after puberty.

From 1926 to 1946 the Extension Department gave skin tests to 498,563 white and 156,515 colored school children—a total of 655,078. In the colored group 21.4 per cent and in the white group 16.8 per cent were positive. Twelve thousand and one (12,001) cases of primary tuberculosis were found, and 1,110 of the reinfection type(11).

### *Portable Fluoroscopes*

From the beginning of the county tuberculosis clinics in 1919 until 1935, the clinic physicians relied mainly on the history, physical findings, and the outcome of sputum examinations and tuberculin tests for diagnosis. In the earlier days x-ray facilities over the state were rather limited, and the quality of chest films often was unsatisfactory. Gradually the situation improved and it was possible to refer more doubtful cases for x-ray; the majority still were being given only a physical examination, however, and of course most minimal cases and some moderately advanced ones were missed. In 1935 specially designed portable fluoroscopes were purchased for the county clinics, and with these the clinic physician was able to see 25 to 100 patients daily instead of 12 or 15, and to find pulmonary tuberculosis in a much earlier stage than was possible by physical examination. During the two-year period 1940-1942, a total of 34,104 persons were examined in the fluoroscopic clinics and 725 new cases of tuberculosis were found(12).

### *X-Ray Interpretation Service*

In addition to the adult and school clinics and the outpatient clinic, the Extension Department furnished from its beginning in 1914 a chest x-ray interpretation service. Dr. McCain invited any physician in the state to send chest films to the sanatorium for reading and recommendations. In 1930 only 229

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8. Seventeenth Annual Report of the North Carolina Sanatorium, 1930, p. 10.

9. Seventeenth Annual Report of the North Carolina Sanatorium, 1930, p. 25.

10. Seventeenth Annual Report of the North Carolina Sanatorium, 1930, p. 15.

11. Unpublished data.

12. Biennial Report of the North Carolina Sanatorium and the Western North Carolina Sanatorium, 1940-42, p. 12.

films(13) were sent in, but during the two-year period 1942-1944 a total of 9,041(14) were received.

When World War II began, the Extension Department lost all of its physicians. An effort was made to continue the work, however, by sending an x-ray technician into the towns and counties upon request to make chest films of children and adults who had already been skin-tested by the local health officer. The films were processed and read at the Sanatorium. This type of service is still available. Dr. McCain himself continued the outpatient clinic at the North Carolina Sanatorium, and similar clinics were opened by the medical directors in both the Western and the Eastern Sanatoria. During the two-year period 1942-1944, a total of 8,987 persons were examined in these clinics.

### *North Carolina's Record*

These various case-finding and educational programs started by Dr. L. B. McBrayer and Dr. P. P. McCain and continued with so much enthusiasm by Dr. McCain until his death have made North Carolina a leader in tuberculosis control in the South. Numerous physicians from other states have spent time in North Carolina observing the work here. Many doctors now in practice in the state have spent some time in one of the sanatoria learning facts about the disease which have enabled them to make an early diagnosis more often.

### *Mass Surveys*

The development within the past few years of equipment for making miniature chest films has made possible a great expansion of the case-finding programs everywhere. The appropriation of $10,000,000 by Congress in 1944 for tuberculosis control in the United States provided the necessary funds. Soon afterward a Division of Tuberculosis Control was established in the North Carolina State Board of Health. The new division set about to equip itself with the new type of photoroentgen mobile units; delivery was slow, however, and to date they have been able to get only six units. The director of the division says that he has more requests for surveys than he can take care of for some time to come, and he feels that the enthusiastic reception granted his department by the public is the result largely of the excellent groundwork laid by Dr. McCain through the Extension Department.

The Bureau of Tuberculosis Control made x-rays of 210,000 persons in 1946, and of 116,000 more during the first six months of 1947. Between 3 and 4 cases of tuberculosis per 1,000 examinations were found. Of the cases found, 67.6 per cent were minimal, 15.3 per cent moderately advanced, 6.4 per cent far advanced, and 10.7 per cent in an unknown stage. It is especially encouraging to note the relatively large number of cases diagnosed in the minimal stage by this method as compared to the older methods; this improvement should result in shorter periods of hospitalization, fewer infected contacts, and more arrested cases suitable for rehabilitation.

### *Summary*

The development of an official tuberculosis case-finding and educational program in North Carolina has been traced from its beginning in 1914 to its present expanded stage. To Dr. Paul P. McCain should go most credit for its growth and for its popularity with the medical profession and the general public.

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# Maternal Welfare Section[*]

## CASE REPORTS FROM THE MATERNAL WELFARE COMMITTEE

### *Tuberculosis Complicated by Pregnancy*

Opinion as to the influence of pregnancy and labor on pulmonary tuberculosis varies widely. The obstetric literature each year contains several articles on this important subject. The incidence of tuberculosis among pregnant women is consistently given as 1 to 2 per cent in the various reports(1). The in-

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13. Seventeenth Annual Report of the North Carolina Sanatorium, 1930, p. 14.
14. Reports of North Carolina Institutions for Physical Defectives, 1942-44, p. 13.

[*] Prepared for the Maternal Welfare Committee of the Medical Society of the State of North Carolina.

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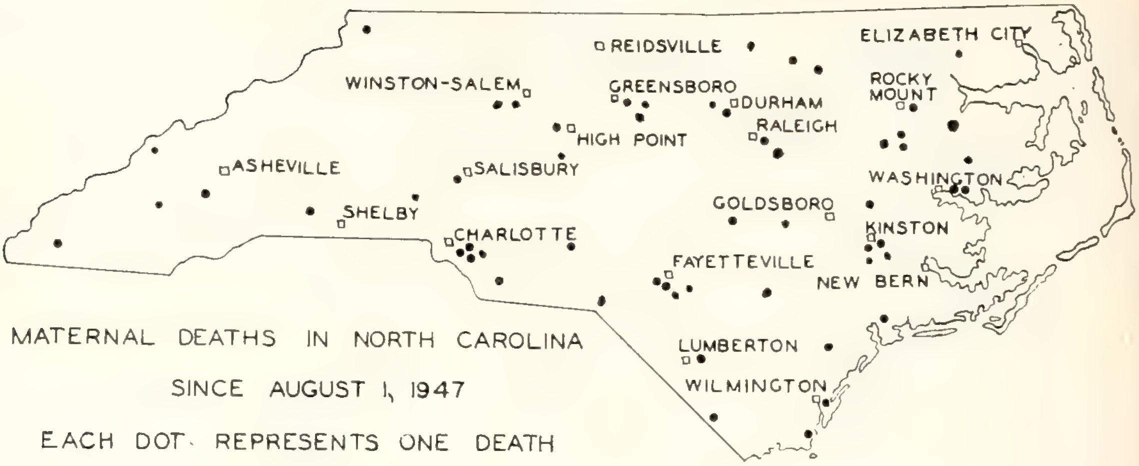
1. (a) Eisele, C. W., Tucker, W. B., Vines, R. W., and Batty, J. L.: Problem of Unsuspected Tuberculosis in Pregnancy: Incidence by Roentgenologic Techniques Compared with Incidence of Unsuspected Syphilis, Am. J. Obst. & Gynec. 44:183-196 (Aug.) 1942; (b) Frank, R. and Jacobs, A. L.: Chest Screening in Antenatal Clinic, Brit. M. J. 1:394 (March 18) 1944.



MATERNAL DEATHS IN NORTH CAROLINA SINCE AUGUST 1, 1947

EACH DOT REPRESENTS ONE DEATH

cidence is somewhat greater in colored than in white patients. Approximately 75 per cent of investigators agree that pregnancy has an adverse effect upon the course of tuberculosis(2). All observers agree that unrecognized and untreated tuberculosis complicated by pregnancy represents a serious hazard to the mother's life.

Ignorance, poverty, and a lack of facilities are often factors in a patient's failure to seek treatment or to cooperate with her physician when the combination of pregnancy and tuberculosis is recognized. In some cases, however, failure of the physician to make the diagnosis of tuberculosis may be responsible for improper treatment and may lead to an untimely death.

Exacerbation of tuberculosis may occur in the early months of pregnancy, or within the first few months following delivery. The problem is illustrated by the following case reports.

### *Case 1—N. C. M. W. C. 227*

A 17-year-old unmarried colored girl consulted a physician in the fourth month of her second pregnancy. Her history and physical examination revealed no significant findings in any of the major systems. She was followed during the prenatal period, and no abnormality was recorded. Her blood pressure was normal at all times, and no albumin or other abnormal urinary findings were recorded. She gained 18 pounds during the course of her pregnancy.

Labor began spontaneously on April 6, 1947, at term. She was delivered in a hospital after a six-hour labor. Delivery under a light ether anesthetic was normal and spontaneous.

The puerperium was uncomplicated during the first fourteen days. Then the patient began to have a moderate productive cough and to run fever. On the twentieth postpartum day, an x-ray of the chest revealed consolidation of the middle lobe of the right lung, and an x-ray diagnosis of pulmonary tuberculosis was made. In spite of the best care, the lesion progressed rapidly until there was extensive involvement of both lungs. The patient died on June 18—eleven weeks after her delivery.

### *Case 2—N. C. M. W. C. 226*

A 30-year-old colored woman first consulted a physician in the seventh month of pregnancy. She had no complaint, and the history and physical examination revealed no abnormality. There was a known family history of tuberculosis. Her usual weight was given as 105 pounds. On her first visit to the physician, she weighed 121 pounds, and she gained 9 more pounds during the rest of her pregnancy. No complication occurred during the prenatal period.

On February 3, 1947, the spontaneous onset of labor was followed after eight hours by the spontaneous delivery of a normal child. A few whiffs of chloroform were used for anesthesia. The puerperium was apparently uncomplicated, and the patient was entirely well when she was seen on the tenth postpartum day. Four weeks after delivery she began to have fever each day, and complained of general malaise. Eight weeks **post partum**, on April 16, she was observed to be chronically and desperately ill; she had abdominal swelling which continued until the time of her death, and she lost weight rapidly.

Physical examination showed the patient to be pale, markedly emaciated, and mentally dull. The tongue showed moderate atrophy at the margins. Examination of the chest revealed limited descent of the diaphragm and decreased intensity of the breath sounds at the base of the right lung, but no rales or wheezes were present. The abdomen was protuberant, with full flanks; the entire abdomen was soft and doughy to palpation. The liver edge was felt one finger's breadth below the costal margin. No additional positive findings were recorded. Laboratory examinations of the blood and urine were within normal limits.

X-ray of the chest showed an area of increased density, not sharply defined, overlying the right fourth rib anteriorly; it had the appearance of a soft parenchymal lesion. A small area of increased density was seen in the periphery of the right second interspace anteriorly. The costophrenic angle was obscured by pleural thickening. There was a small amount of pleural fluid. The heart was not enlarged. The left lung field was clear. The findings in the right lung field were felt to be due to active pulmonary tuberculosis.

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2. Meixner, F. M. F.: Pregnancy in Tuberculosis, Dis. of Chest 11:409-418 (Sept.-Oct.) 1945.

The patient's course was progressively down hill, and on July 6, five months after delivery, death resulted from pulmonary tuberculosis and tuberculous peritonitis.

### *Discussion*

Each of these patients died of a fulminating type of tuberculosis. In each case, the diagnosis of tuberculosis was made when acute manifestations of the disease appeared in the puerperium. It is possible that infection began after the patients' delivery, but it is much more likely that an active lesion was present during their pregnancy. Early diagnosis, with proper care of the tuberculous lesion during the prenatal period and immediately following delivery, might have saved each patient's life.

Routine fluoroscopic and x-ray examination of prenatal patients is essential to a diagnosis of early pulmonary tuberculosis complicating pregnancy. It is generally agreed that it is impossible to diagnose an early pulmonary lesion by physical examination alone.

The course of tuberculosis is usually determined by the medical care the patient receives. Interruption of pregnancy offers little to the tuberculous patient if it is not followed by modern medical treatment of the tuberculosis.

Several specific points concerning the treatment of tuberculosis complicated by pregnancy are generally accepted:

1. An active spreading tuberculous pulmonary lesion complicated by early pregnancy is an indication for therapeutic abortion. After the fourth month, however, intervention is contraindicated because its effect is comparable to that of full-term delivery.
2. Healed tuberculosis is not an indication for abortion.
3. The prognosis for mother and child depends largely upon the degree of cooperation between obstetrician and phthisiologist. Sanatorium supervision, collapse therapy, and other specific measures must be continued during pregnancy and the puerperium.
4. Patients with chronic forms of tuberculosis under satisfactory treatment may be successfully carried through pregnancy without adverse effects on the tuberculous lesion(3).

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(3) (a) Cohen, R. C.: Effect of Pregnancy and Parturition on Pulmonary Tuberculosis, Brit. M. J. 2:775-776 (Dec. 18) 1943; (b) Cutler, J. W.: Harmful Influence of Pregnancy on Advanced Tuberculosis as Modified by Collapse Therapy, Am. J. Obst. & Gynec. 47:1-19 (Jan.) 1944; (c) Greenhill, J. P.: Year Book of Obstetrics and Gynecology, Chicago, The Year Book Publishers, 1946, p. 62.

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**The X-raying of chest** in the large induction centers graphically demonstrated to the lay public and the medical profession that the chest X-ray is as much a part of the general physical examination as the Kahn, the complete blood count, or the urinalysis, and that tuberculosis can be diagnosed in the minimal stage only by X-raying the chest of the healthy individual.—W. J. Bryan, M.D., Contact, Ill. TB Assn., Apr., 1946.

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# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

## OBSTETRICS AND GYNECOLOGY IN AMERICA

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

DURHAM, NORTH CAROLINA

### XI

## HOWARD ATWOOD KELLY, 1858-1943

Less than a century ago, innumerable women in every walk of life were forced to endure painful, distressing, often humiliating disabilities, without hope of cure or relief. Doctors and surgeons feared to espouse gynecology, the dangerous mistress of their science, since the way she trod was obscure and edged with death. The suffering women were passed on from one physician to another and found no help; *ne les touchez* made pariahs of these suffering ones. Yet here and there a few doctors were drawn to the study of gynecologic problems and, more bold than their colleagues, devoted their lives to the science. To their courage and to their skill in evolving medical and surgical techniques many women of today owe health and even life itself.

Among these enterprising men were James Marion Sims and T. Addis Emmet, with whom earlier "Thumbnail Sketches" have dealt. During the years while those two brilliant surgeons were directing the Woman's Hospital of New York, there was born, on February 20, 1858, one destined to carry on their work: Howard Atwood Kelly.

Born in Camden, New Jersey, Dr. Kelly received his academic education at the University of Pennsylvania. Throughout the greater part of his college career he prepared himself for research in the natural sciences; then he determined to go into medicine. He graduated with honors in 1877, and in the fall of that year he entered the medical department of the University. A persistent insomnia, brought on by an overactive mind, interrupted his course for a year, which he spent on the plains of Colorado.

Immediately after receiving his medical degree, in 1882, Kelly served his residency in the Episcopal Hospital and there became deeply interested in the poor of Kensington, a mill district on the outskirts of Philadelphia. He determined to practise in this district rather than uptown, whither the circumstances of birth and ample means strongly beckoned him.

In the Episcopal Hospital, the wards were filled with general surgical and medical patients; the specialties were still in their infancy, and gynecologic surgery was unwelcome. Perhaps for that very reason the young zealot, Kelly, became interested in the diseases of women. During his year of residency he prepared for the *Medical News* a report on a method of extracting kidneys through the vaginal vault, an article which attracted the attention of William Osler in Montreal.

Kelly's first move, when his medical training was completed, was to establish himself in a small house in Kensington, where, with the help of a woman whom he trained in nursing care, he treated patients for whom there was no place in the larger hospitals. From this small beginning eventually emerged the well-known Kensington Hospital for Women.

Several trips abroad to study and observe, and avid reading of gynecologic literature contributed to the young surgeon's equipment for the specialty he had chosen. Meanwhile, former professors kept an eye on his work—among them, Osler, who had come to the University of Pennsylvania as professor of clinical medicine. When Professor Goodell was about to retire, Kelly was sought to succeed him in the chair of gynecology; in the interim he was appointed, jointly with Barton Cooke Hirst, to the associate professorship of obstetrics.

During Kensington days, Kelly developed the combined vaginal and abdominal method of examination—a great aid to diagnosis—, perfected the common plastic repairs, and successfully operated through the abdomen. At this time he began the work on the female urinary tract which he subsequently considered his most important contribution to gynecology. At Kensington, too, a large obstetric practice led him to devise the pad still used universally not only in cases of childbirth but in all pelvic operations.

The Department of Gynecology at his *alma mater* was never to know Dr. Kelly's guiding hand. Developments in another city to the south opened up wider avenues of service, more attractive to the young surgeon. In Baltimore the Johns Hopkins University under President Gilman, seeking to carry out the terms of the will of its benefactor, was establishing a medical department. Welch occupied the chair of pathology, and Osler that of medicine. Halsted was then secured for surgery, and Kelly was offered the appointment of professor of obstetrics and gynecology, which he determined in the fall of 1889 to accept. So it came about that these four, each to become illustrious in his own field, shared the distinction of being the founders of the Johns Hopkins Medical School.

Never vitally interested in obstetrics, Kelly after some years took measures to have the professorship divided; he retained the chair of gynecology from 1899 until 1919, when he became professor emeritus. Many of his students have risen to eminence and today occupy chairs of gynecology in outstanding schools of medicine. Several hundreds came back, in 1933, on the seventy-fifth birthday of their "Chief," to honor the man who had given so much to them.

Side by side with the School of Medicine grew the Johns Hopkins Hospital, but not even here was there room enough to accommodate the patients who flocked from all parts of the world to avail themselves of Dr. Kelly's skill. An old hand at meeting emergencies, Dr. Kelly converted a house on Eutaw Place into a small hospital; by 1913 it had grown into four units and was incorporated as the Howard A. Kelly Hospital.

A brilliant mind that went at once to the crux of a matter and a great manual dexterity that executed his decisions in a flash—these combined with a boldness born of assurance to place Howard Kelly in the front rank of his profession. His efforts were crowned with success: extra-uterine pregnancies were recognized and dealt with in

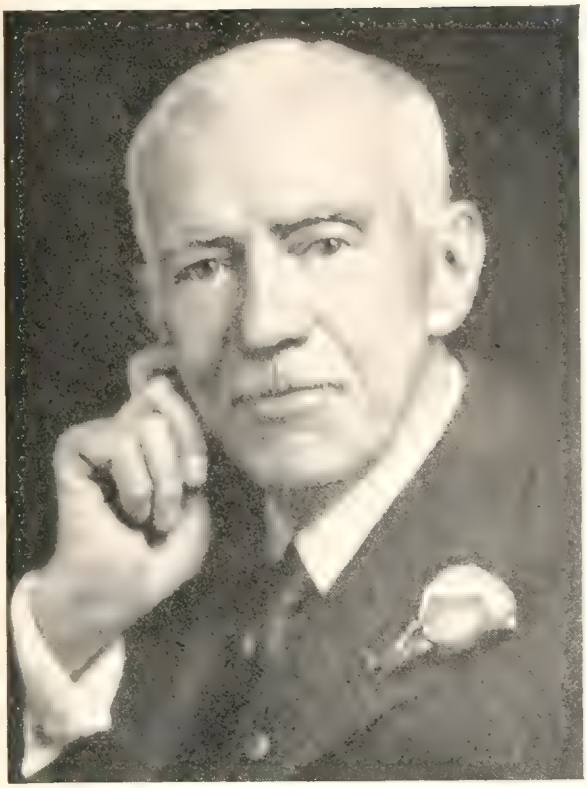

**Fig. 1. Howard Atwood Kelly, 1858-1943.**

the days when few could have made the diagnosis, much less have attempted the operation; his suspensions, amputations, and extirpations of the generative organs and his cesarean sections blazed new trails and made safe the way for others to follow. Madame Curie's discovery of radium opened up a new method for treating cancer, and a supply of radium, bought in 1904 and augmented from time to time, was in Kelly's hands a boon to those suffering from malignancies. Facilities for deep x-ray therapy were added and employed. Under Kelly, electrosurgery too was developed.

However, his was not only to know and to act, but also to pass on his knowledge; therefore cases and methods giving promises of helpfulness were promptly and carefully recorded in the literature. Some six hundred articles and many textbooks came from Kelly's pen. As a young man he had been disappointed in the illustrations accompanying medical texts, and he began to use his own line-drawings to picture the lesions treated and the methods employed. Early in the century he was impressed by the work of the artist, Max Broedel; these two men worked together to improve medical illustration, and the development of the modern school of art as applied to medicine is ascribed to their joint efforts.

Dr. Kelly was interested not only in current medical literature but also in the work of the pathfinders. Medical history filled his shelves, and his study in this field led to his compilation of a useful work on American medical biography. By active participation in the medical historical groups, he quickened and fostered in his students an interest in the work of their scientific forebears.

Through the many years devoted to medicine and surgery, however, Dr. Kelly never lost his zeal for the natural sciences. Mycology, herpetology, geology, botany, and astronomy afforded diversion, and their pursuit sent him every winter to Florida and every summer to his camp in Canada, where he indoctrinated his nine children in the mysteries of nature. An expert swimmer and canoeist, he spent hours on his beloved Lake Ahmic, renewing his health and strength for the winter's exacting work.

Above all, Dr. Kelly was an earnest Christian whose strong faith reached back into early childhood. To him, the poor who sought his aid were his "honor cases." To the poor who gave him their trust in the beginning of his practice he attributed his success, and to them throughout his long life he gave freely of his skill and talent. His door and his heart were open at all times to those burdened or in need. A man of genius and a man of God, Dr. Kelly in a humble, unpretentious way lived a life of service to his fellow man. His body grew frail with the passing years, but his mind was quick and his spirit was valiant to the end. Kelly of Baltimore died on January 12, 1943, just a few weeks before his eighty-fifth birthday.

AUDREY W. DAVIS
Baltimore, Maryland

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**So much emphasis has been placed on tuberculosis as a serious disease of girls and young women** that its greater havoc among men has not received the attention that it deserves. As a result of the more rapid decline of tuberculosis in females in this country there are today 156 deaths among males to every 100 deaths in females and only at ages ten to thirty is the mortality higher in females. Tuberculosis is increasingly becoming a disease of older, occupied men.—Henry D. Chadwick, M.D. and Alton S. Pope, M.D., The Modern Attack on Tuberculosis, The Commonwealth Fund, Revised, 1946.

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NOVEMBER, 1947

## THE McCAIN MEMORIAL ISSUE

While the practice of preparing special numbers of a medical journal to honor individual physicians can easily be overdone, it is quite certain that the editorial board of the NORTH CAROLINA MEDICAL JOURNAL will not be criticized for authorizing the dedication of this month's issue to the memory of Paul Pressly McCain—past president of the Medical Society of the State of North Carolina and first chairman of the JOURNAL's editorial board. In his death last November the Society lost one of its most valuable members, the doctors of the state one of their best beloved colleagues, the patients of the State Tuberculosis Sanatoria one of their best friends, and the cause of tuberculosis control in North Carolina its greatest champion. Dr. McCain's contributions to medicine, as well as the many honors which he received in recognition of his splendid achievements, were outlined in an editorial tribute to him last December. As this editorial stated, however, "This outline does not tell of the man himself. Many times it has been said that if a vote were taken to select the best loved doctor in North Carolina, Paul McCain would be overwhelmingly chosen. Another measure of his worth is the fact that, during the thirty-two years he held public office, no one ever questioned his integrity, his ability, or his judgment."

To Dr. Paul Ringer of Asheville, present chairman of the editorial board, thanks are due for compiling the material for the McCain memorial issue. This fine collection of papers, each contributed as a labor of love by a friend of Paul McCain's, bears testimony to the high regard in which he was held by his colleagues in the field of tuberculosis control.

* * * *

## THE TRUTH ABOUT STERILIZATION

North Carolina was one of the first states in the union to make legal the sterilization of persons who are mentally defective or who have certain forms of mental disease apt to be transmitted to their offspring. The legislature of 1919 passed the first sterilization law, but its wording was not clear, and no operations were performed until after the present act was passed in 1933(1). By the end of 1945 only 1722 individuals had been sterilized, although it has been estimated that there are at least 71,000 feeble-minded persons in the state(1). Compared with the other twenty-three states with similar laws, North Carolina is fifteenth in the ratio of sterilizations to population.

In an effort to create more interest in the matter, and to arouse more public sentiment for sterilizing the mentally unfit, the Human Betterment League of North Carolina is distributing a pamphlet on sterilization, in question and answer form. This is reproduced on page 749. The physicians of North Carolina would do well to study the questions and answers given, so that they may have accurate information on the subject. More than any other group of comparable size, they are in a position to influence public opinion and to help our state derive the benefit that it should from its excellent sterilization laws.

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1. Richardson, W. P. and Gamble, Clarence J.: The Sterilization of the Insane and Mentally Deficient in North Carolina, North Carolina M. J. 8:19-21 (Jan.) 1947.

## MRS. PAUL McCAIN—TUBERCULOSIS SEAL SALE CHAIRMAN

The *News Letter* of the North Carolina Tuberculosis Association for October announces that Mrs. Paul McCain is the State Seal Sale Chairman for 1947. A more fortunate choice could not be imagined. As the *News Letter* says, her interest in the control of tuberculosis

> "is definitely no new ardor, but one that always has been an important part of her life. Her late husband, Dr. Paul P. McCain, was superintendent of North Carolina Sanatoria for 22 years, and he was well known throughout the State and nation as an outstanding man and a dynamic leader in the fight to control tuberculosis. Mrs. McCain's father, Dr. L. B. McBrayer, was superintendent of the North Carolina Sanatorium and later executive secretary of the North Carolina Tuberculosis Association."

The *News Letter* might have added that both Dr. McCain and Dr. McBrayer served as presidents of the State Medical Society, and that Dr. McBrayer was its secretary for fifteen years (1922-1937) — longer by far than any other man ever held that important office.

Mrs. McCain—known and loved by her many friends as "Sadie"—is the mother of the Auxiliary to the Medical Society of the State of North Carolina, and in 1944 was named North Carolina's Mother of the Year. This JOURNAL fully agrees with the *News Letter's* statement:

> "Mrs. McCain is outstanding in the State, and it is a distinct honor and privilege to have her as State Seal Sale Chairman for 1947."

Mrs. McCain's message concerning the Tuberculosis Christmas Seal is so good that it is quoted in part:

> "We are coming again to that time of year when our thoughts turn to the Tuberculosis Christmas Seal. This year we have not only a pretty seal but a very suggestive one—a team of oxen pulling a sled of Christmas trees. What a wonderful thought—TEAMWORK.
>
> "Teamwork has saved 4,000,000 lives in the United States since the organization of the National Tuberculosis Association in 1904. It has saved 4,605 lives each year in North Carolina. Conservative figures say each death costs the State $3,000—thus, a saving of $4,000,000 per year. This same cooperation has brought about an 80% reduction in the death rate in the last 40 years. Teamwork in selling Christmas Seals and in Tuberculosis Education has had a great part in this fight. The splendid cooperation between tuberculosis leaders and governmental authorities in the providing of diagnostic facilities and beds for those needing treatment has been very important. We are proud of the showing of North Carolina in 1946—28.5 deaths per 100,000 against a national average of 35.9 deaths per 100,000. Another important factor in this overall teamwork picture is the part played in the fight by those who have had the disease themselves."

* * * *

## "GENTLEMAN JIM" RETIRES

After forty-nine years of teaching, Dr. James Bell Bullitt has become professor emeritus. As instructor in anatomy at his alma mater, the University of Virginia, as professor of anatomy at the University of Mississippi, and for the past thirty-four years as professor of pathology at the University of North Carolina, Dr. Bullitt has contributed much to the training of many doctors in this and other states.

His students and confreres in medicine early came to have a profound respect for the breadth and depth of his general knowledge and for his ability as a pathologist. More than anything, however, they have valued the integrity of the man, and his innate qualities of generosity, unselfishness, modesty, kindness, considerateness, and courteousness. Instinctively these qualities have been recognized and appreciated by all who came in contact with him—hence the fond title of "Gentleman Jim" bestowed upon him by successive generations of medical students.

As teacher, medical officer in World War I, colonel in the Medical Reserve, active member and officer of county and state medical societies, friend and benefactor to the University and to many of his students, Dr. Bullitt has touched many lives and has had great influence in the fields of medicine and education. He is in truth a witness to his own immortality. His many students and friends hope that he will have many years in which to enjoy his golf, reading, woodcarving, and his studies in archaeology and anthropology—years in which many may benefit not only from his experience and knowledge as a pathologist, but also from his wise counsel as one of the elder medical statesmen in North Carolina.

## A LESSON FROM THE FRITZ CASE

Recently there has been much said in the press about the case of Mr. R. L. Fritz, Jr., former president of the North Carolina Education Association, who was deprived of his teacher's certificate for careless handling of school funds. In the course of the investigation, some facts were brought out that are not too flattering to our secondary school system nor to our teachers. For example, Lynn Nisbet, a newspaper correspondent in Raleigh, wrote:

> "It is of common belief—if not of common knowledge—that many local school officials juggle daily attendance records in order to secure or retain allotted teachers that might be lost on a basis of accurate attendance."

A former school teacher said:

> "I was honest for the first month that I taught. My attendance averaged 76 per cent for the month and I put it down that way. But it jumped to 98 per cent the next month—and stayed there despite epidemics, bus breakdowns, bad weather, and all other acts of Providence. Those older in the game had taken me aside after that first month and pointed out that since I was the last teacher to join the faculty, I would naturally be the first to be dropped if attendance warranted a reduction in teacher allotment. I needed the job, so from then on the figures in my carefully-kept register stayed up in the high 90's, along with those of every other class. It looked pretty on the books!"

Since the proponents of governmentally controlled medicine often point to our public school system as a shining example of efficiency, it is not unfair to comment upon the effect of political control on the morale and integrity of teachers and school principals. Teachers admit that they have been forced to pad their registers; principals juggle daily attendance records to insure an adequate number of teachers; and Professor Fritz's payroll irregularities apparently are not considered unusual, since many teachers are defending him.

The above paragraph is not written to criticize the teachers in our public schools, but to remind our readers of the frailties of human nature. Doctors are as human as teachers. The New Zealand version of the Wagner-Murray-Dingell bill, since it was enacted into law, has cost many times over the estimate originally set—partly because, to the shame of the doctors, they have been padding their expense accounts just as our North Carolina school teachers are padding their attendance records.

May God preserve the doctors of North Carolina and of the United States from similar temptation.

## THE PUBLIC EDUCATION SYSTEM*

For years the virtues of our system of public education have been extolled by those who favored "state medicine." "Look," said they, "consider how well it works, how equitably for all. It could be a model for a tax supported system of medical service. Everybody would be better served. Look at the noble school buildings, the excellent textbooks, the fine laboratories, the pension system, the compulsory education for everybody at everybody's expense."

Well, we have looked at it. Certainly the plant and structure is good. Textbooks are available. Athletic fields abound. Gymnasiums are provided. Sanitary facilities are of the best and usually well maintained. Bus service is available in rural and suburban areas generally. But what has happened to the teachers?

Daily we note that some are finding it necessary to take other jobs such as part-time bartending to supplement their miserable pittances as teachers; others are frankly quitting the profession.

Public indifference to their reasonable requests for more equitable salary levels is in many instances discouraging superior talent from consideration of teaching as a profession and forcing out discouraged personnel who find it impossible to maintain a decent standard of living and their own self-respect at present salary levels.

We hold no brief for commercialism in the professions. We have the greatest respect for the teaching profession. It has endured much; it deserves immediate rectification of gross salary inequalities before irreparable damage to its high quality and superior performance has been done.

We also take this occasion to point out again the inherent faults of government control and what inevitably happens thereunder where the professions are concerned. If the quality of teacher personnel and interest deteriorates, of what use are the buildings, the athletic fields, the good textbooks, the noble plumbing fixtures?

Under, for instance, national health insurance schemes, would we not face the same discouraging factors? More important even than what government control can do *for* you, is what it can do *to* you.

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* Reprinted from Current Editorial Comment, New York State J. Med. 47:1770 (Aug. 15) 1947.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

INSANE PERSONS: *The legal presumption is that all persons of mature age are sane. After they have been adjudged insane, however, the presumption is reversed until evidence is produced to show that they have become sane.*

This is an action in which a husband entered suit against his wife for an accounting of funds, for cancellation of a property settlement agreement, and for the cancellation and setting aside of a deed. From a decree of the circuit court dismissing the complaint, the husband appealed to the Supreme Court.

The plaintiff in this case had been adjudged insane by a county court on May 8, 1940, and committed to a mental institution. He had been to several other hospitals previously, but not under commitment. On July 26, 1940, he was found to be sane by the same court, and was discharged from the hospital on that date.

Shortly after the plaintiff was adjudged of unsound mind, his wife was appointed conservatrix of his property. Following the decree of the restoration of sanity, the wife was ordered to file an accounting; this she failed to do.

After the husband had been restored to his rights as a man of sound mind and memory, he and his wife decided to separate, and drew up a contract to that effect. Both signed the articles of separation and the property settlement. Later, the husband attempted to repudiate the contract, and notified his wife of this intention by letter. Eventually, he filed this suit to force the conservatrix to account for the property which came into her hands as a result of her official position, and to cancel the property agreement noted above.

The Supreme Court was of the opinion that a satisfactory accounting had been made by the conservatrix; that contrary to certain allegations of the appellant, there was no duress; and that, as the husband had been judicially declared sane, he was fully competent, in the absence of proof of insanity, to enter into an agreement. The husband, according to the records, suffered from paresis, and naturally there was some question, from a medical standpoint, as to his being fully restored. The condition had been present for several months, and no doubt had brought about very definite damage to the brain cells. The appellant's lawyers, depending upon the action of the Court and the history of the case, did not offer any evidence tending to show that he was of unsound mind at the time the agreement of separation was signed, although they were apparently depending upon insanity as a defense.

As was noted above, the action of the court in issuing a decree which restored the appellant to his rights, before the articles of separation were signed, had placed the appellant in his original position. The Supreme Court, in this connection, stated that a person of mature age is presumed to be sane and that unless the contrary was proved, the history in this particular case was of no significance in showing a lack of mental capacity to enter into an agreement.

The Supreme Court affirmed the action of the court below, and ruled that the separation agreement was legal and in force.

(Illinois Supreme Court, March, 1946. V. 66, N. E. Reporter, Second Series, p. 316.)

**A final diagnosis of tuberculosis** should never be made on the first x-ray film. A disturbing number of films showing definite infiltration of the lung field will be found to have cleared completely on a retake made two weeks later, and the parents will be spared much unnecessary worry and the radiologist no little embarrassment by this simple precaution. Students (and others) found to have significant lesions should be given a complete examination, including a tuberculin test and x-ray at once to determine the nature and activity of the process and the need of treatment. Those with inactive or suspicious lesions should be re-examined at least every six months to determine the questions of activity.—Alton S. Pope, M.D., NTA Bull., Nov., 1946.

**The general hospital** is in a unique position in tuberculosis control. Institutions in large cities, especially, can participate actively in such necessary contingent aspects of control as rehabilitation and the social and economic problems posed by this family and community disease. For highest effectiveness, hospital services for the tuberculous should be integrated with the public health programs in the city, town, or county. In every institution, the general practitioner must be an active participant in the radiography program. He provides the hospital with its patients, makes the final diagnosis, and treats those persons who are singled out by routine chest x-ray. Editorial, Pub. Health Rep., May 2, 1947.

# TUBERCULOSIS ABSTRACTS

*A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX November, 1947 No. 11

THE MOUNTING TOLL of heart diseases and cancer, which are primarily disorders of middle and late life, tends to foster too much complacency over the continuing reduction in the death rate due to tuberculosis. It is well to be reminded that death figures tell but one side of the story. To look behind mortality statistics and to consider their real meaning in terms of lives saved or ended prematurely is a salutary corrective to unwarranted optimism regarding tuberculosis.

## TUBERCULOSIS DEATH RATE FAILS TO TELL THE ENTIRE STORY

The best available single index as to the status of tuberculosis control is and always has been the mortality rate from this disease. The success of the tuberculosis program is best measured by the steady decline in the death rate during the past several decades. It is an impressive fact that tuberculosis mortality in the country as a whole has declined 53 per cent between 1924 and 1944.

The drop in tuberculosis mortality varies widely in the sex and color groups. The greatest decline in the past 20 years, for example, has been registered in the death rate for white women among whom the drop was 67 per cent; among non-white men, on the other hand, tuberculosis mortality declined but 42 per cent during the same period. (According to the last Federal Census, 99.4 per cent of all non-whites in the United States were Negroes; hence the two groups are almost identical.)

Table 1 shows for each sex and color group the tuberculosis death rates in the past two decades, as well as the percentage decline in mortality.

| Sex and color | Tuberculosis death rate 1944 | 1934 | 1924 | Percent. decline in tuberc. death rate 1924-1944 | 1934-1944 |
|---|---|---|---|---|---|
| All groups | 41.3 | 56.7 | 87.9 | 53.0 | 27.2 |
| White | 33.7 | 46.2 | 74.9 | 55.0 | 27.1 |
| Male | 45.0 | 52.7 | 79.3 | 43.3 | 14.6 |
| Female | 23.3 | 39.6 | 70.4 | 66.9 | 41.2 |
| Non-white | 106.2 | 148.8 | 218.6 | 51.4 | 28.6 |
| Male | 122.7 | 156.9 | 215.0 | 42.1 | 21.8 |
| Female | 91.3 | 140.8 | 222.3 | 58.9 | 35.2 |

For no major cause of death has a mortality decline been recorded which compares favorably with the drop in the tuberculosis death rate. On the contrary, mortality from heart diseases, cancer, and certain other leading causes has increased rather steadily while that from tuberculosis has been dropping continuously.

Table 2 gives the 1944 death rates from these three major causes for each sex and color group.

| Sex and color | Death rate per 100,000 population in 1944 Heart diseases | Cancer | Tuberculosis |
|---|---|---|---|
| All groups | 315.4 | 129.1 | 41.3 |
| White | 310.1 | 128.8 | 33.7 |
| Male | 398.6 | 135.5 | 45.0 |
| Female | 254.2 | 133.3 | 23.3 |
| Non-white | 239.0 | 81.9 | 106.2 |
| Male | 274.3 | 75.6 | 122.7 |
| Female | 220.6 | 92.2 | 91.3 |

These death rates, though admittedly correct, tend to be misleading as to the relative importance of these three diseases. More of those who die of heart diseases and of cancer are elderly than is the case with those who die of tuberculosis. Moreover, tuberculosis is not only communicable but is preventable to an extent greater than either heart diseases or cancer.

A computation made to show the potential loss in years of life resulting from deaths from heart diseases, cancer, and tuberculosis in 1944 demonstrates vividly the seriousness of the disease which too often leads to prolonged illness and death in youth or middle age. This computation is based on the expectation of life at birth, as published by the Metropolitan Life Insurance Company in its Statistical Bulletin for May, 1946.

Separate analyses have been made for white and non-white men and women since these groups vary widely not only as to their expectation of life, but in the age distribution of deaths from certain causes.

The method used in this computation is simple indeed. For example, the average white woman may expect to live 69 years. If she dies at the age of 24 from tuberculosis, she has lost 45 potential years of life, whereas if she dies at 62 of heart disease, she has lost but seven potential years.

In the aggregate 1,929,953 potential years of life were lost by all Americans who died of heart diseases in 1944, compared with 1,287,245 potential years lost by those who died of cancer and 1,175,500 by those who died of tuberculosis in that year. In other words, because of the differences in the ages of those who died from these diseases, the potential loss in years of life occasioned by deaths from tuberculosis is within ten per cent of the loss caused by cancer, even though the tuberculosis death rate is but 32 per cent of the cancer death rate.

In spite of the fact that the mortality from heart diseases is seven and one-half times as high as that from tuberculosis, the potential years of life lost by those who died of heart diseases in 1944 were less than twice as numerous as the years lost by those who died of tuberculosis in the same year.

For many years the steadily declining tuberculosis death rate has been emphasized as the most significant evaluation of tuberculosis control. Less importance has been attached to a secondary result, namely, that not only are those who die of tuberculosis fewer in number each year but the median age at death becomes somewhat higher. These two encouraging developments have led some persons to the erroneous conclusion that tuberculosis is no longer a serious problem in this country. Yet, in spite of the declining death rate and the advance in the median age at death from tuberculosis, deaths from tuberculosis occur at much younger ages even today than do deaths from heart diseases and cancer.

It is clear from these findings that tuberculosis still constitutes one of our most serious social problems because of the comparative youth of the patients and decedents. Since all cases of tuberculosis are preventable, the disease also presents a more acute public health problem than do other major causes of death. Tuberculosis is unquestionably the most serious public health problem among non-white races; moreover, the gravity of this disease among white men has never been given proper consideration.

**Decline in Tuberculosis Death Rate Fails to Tell the Entire Story, Mary Dempsey, The American Review of Tuberculosis, August, 1947.**

# BULLETIN BOARD

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF MEDICINE

The School of Medicine and the Extension Division will resume this year postgraduate courses for physicians throughout the state. To date courses are scheduled at Lumberton and Salisbury beginning the middle of January, to be followed by courses at Greensboro and Raleigh and perhaps one or two other towns. Announcement of programs will be made in the next issue of the **Journal**.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF PUBLIC HEALTH

The following staff members of the School of Public Health of the University of North Carolina attended the seventy-fifth annual meeting of the American Public Health Association at Atlantic City, New Jersey, October 6-10, 1947: Dr. E. G. McGavran, dean; Dr. John J. Wright, head of the Department of Public Health Administration; Dr. Lucy S. Morgan, head of the Department of Public Health Education; Professor Ruth W. Hay, head of the Department of Public Health Nursing; Miss Lake Allen, research assistant; Professor Paul D. Haney, Department of Sanitary Engineering; Professor Emil T. Chanlett, Department of Sanitary Engineering; Dr. Cecil G. Sheps, Department of Public Health Administration.

Dean E. G. McGavran will remain a member of the Executive Committee of the Governing Council of the APHA; he was made a member of the subcommittee on Field Training of the Professional Education Committee of the APHA, and was elected chairman of the Committee on Salaries for the Health Officers' Section of the APHA.

Dr. Lucy S. Morgan was placed on the Nominating Committee for the Governing Council Members of the Public Health Education Section of the APHA and will remain on the Advisory Board of the Cleveland Health Museum, the Section Council of the Health Education Section, the Governing Council of the APHA, and the Health Education Committee of the American Red Cross.

Professor Paul D. Haney was placed on the Nominating Committee for the Engineering Section and will remain on the Committee on Rural Sewerage Disposal of the Engineering Section.

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Dr. H. A. Morgan, director of the Tennessee Valley Authority, and Mr. W. M. Landess, head of the Agricultural Exposition Unit of the Tennessee Valley Authority, lectured to the School of Public Health at the University of North Carolina and North Carolina College (Durham) the week of October 13-16. The discussion was centered around the interdependence and interplay of basic factors, including laws which nature has set in motion, and man's recognition, understanding, and use of them, in determining our fundamental approach to achieving individual, national, and world security.

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Dr. Cecil G. Sheps, who was a visiting professor on the staff of the School of Public Health last summer, has been appointed associate professor of public health administration, School of Public Health, and assistant director of the epidemiology-syphilis study sponsored jointly by the Rockefeller Foundation and the North Carolina State Board of Health. Dr. Sheps received his M.D. degree from the University of Manitoba Medical School in 1936 and his M.P.H. at Yale University in June, 1947. Prior to coming to the University of North Carolina, he served as house surgeon in a general hospital in Stourbridge and London during the years 1937 and 1938; he conducted a private general practice in Winnipeg from 1939 until 1943; and from 1943 until 1946 he was school health physician for the City of Winnipeg Health Department.

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Miss Elta Mae Mast has joined the faculty of the School of Public Health as an assistant professor in public health education. Miss Mast was graduated from the Illinois State Normal University in 1942 with a B.S. degree; she received her M.S.P.H. from the School of Public Health of the University of North Carolina in 1945. From 1945 until her arrival at the University, Miss Mast was school health adviser with the Illinois State Department of Health, State Education Department in Springfield. Prior to this she held the position of biology teacher in the Normal, Illinois, public schools.

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Mrs. Ida H. Friday has been appointed assistant in public health education at the School of Public Health and director of the Health Education Workshop. Mrs. Friday received her A.B. degree from Meredith College and her M.P.H. degree from the School of Public Health of the University of North Carolina in June, 1947.

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Dr. Harold J. Magnuson, research professor of experimental medicine, has been presenting a paper, "The Development of Acquired Immunity in Experimental Syphilis," to Venereal Disease Seminars, held under the auspices of the U. S. Public Health Service, throughout the country. The September meeting was in Detroit, Michigan; the October meeting in Jackson, Mississippi; and the November meeting in Boise, Idaho. The work reported is part of the research program of the Reynolds Research Laboratory.

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Dr. Seymour P. Halbert, assistant professor of experimental medicine, has returned from a three months' field study at Letchworth Village, Thiells, New York. This field study was carried out as a part of the research work of the Reynolds Research Laboratory on antibiotic-producing strains of Escherichia coli.

## CORRECTION

**The Journal apologizes for an error which occurred on page 653 of the October issue, in the article, "Apoplexy of the Abdominal Wall," by Dr. T. C. Bost. The final paragraph on that page begins: "Tenderness and rigidity over the site of injury may be extreme. An indefinite mass is often seen and felt, and the area adjacent to the mass has a tenderness or rigidity." This last sentence should read as follows: "An indefinite mass is often seen and felt, and the area adjacent to the mass has NO tenderness or rigidity."**

## NEWS NOTES FROM THE STATE BOARD OF HEALTH

While there were 77 more deaths in North Carolina reported to the State Board of Health during the first half of 1947 than in the corresponding period of 1946, there were, at the same time, 13,593 more births. The total number of deaths reported from January 1 through June 30 was 15,482, compared with 15,305 for the corresponding period of 1946, while the total number of recorded births was 57,176, as compared with 43,583 the first half of last year.

Deaths resulting from what are termed infant diseases totaled 1,345 during the first half of 1947, as compared with 993 during the corresponding period of 1946—an increase of 352, as compared with an increase of 77 in the number of deaths from all causes.

Of the grand total of 15,482 deaths reported to the North Carolina State Board of Health from January through June of this year, 8,196, or considerably more than one-half, were attributed to four causes: diseases of the heart, 3,779; intracranial vascular lesions, 1,736; nephritis, 1,390, and cancer, 1,291. There were, however, slightly fewer deaths from cancer this year than last, for the corresponding period.

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Rocky Mountain spotted fever is now more prevalent in North Carolina than typhoid fever, of which only 53 cases were reported among our nearly four million people last year, as compared with 66 cases of Rocky Mountain fever. Even typhus fever is now more prevalent than typhoid—and the menace of this disease will continue as long as we tolerate rats, whose population is increased by lax garbage collection and indifference on the part of householders who fail to protect the refuse they put out for the town or city to haul away.

## NORTH CAROLINA NEUROPSYCHIATRIC ASSOCIATION

A meeting of the North Carolina Neuropsychiatric Association was held at the State Hospital at Butner on October 31. Guest speakers were Dr. T. A. Watters of the Tulane University Medical School, Dr. Howard R. Masters of the Medical College of Virginia, and Dr. Joseph A. Farmer of the Institute of Living, Hartford, Connecticut. North Carolina doctors taking part on the program were Drs. Richard L. Masland, Douglas M. Kelley, and E. O. Jeffreys of Winston-Salem, Drs. Leslie B. Hohman, Maurice H. Greenhill, and Hans Lowenbach of Durham, and Dr. R. G. Blackwelder of Raleigh.

Dr. R. Burke Suitt of Durham, vice president during 1947, was elected president for 1948, succeeding Dr. David Young of Raleigh. Dr. Lloyd Thompson of Winston-Salem was named vice president, and Dr. Frederick H. Hesser of Durham was re-elected secretary-treasurer.

## SEVENTH DISTRICT MEDICAL SOCIETY

The following speakers appeared on the program of the Seventh District Medical Society meeting, held in Charlotte on November 5: Drs. James E. Hemphill and Tom W. Baker of Charlotte, Dr. Hugh H. Mills of Forest City, Dr. Frank Howard Richardson of Black Mountain, and Dr. D. E. Yow of Concord. Dr. Frank A. Sharpe of Greensboro, president of the State Medical Society, and Gus Travis, newspaper columnist of Charlotte, spoke at the banquet meeting.

Dr. J. A. Elliott of Charlotte, vice president of the society this year, was elected president for 1948, succeeding Dr. F. Y. Sorrell of Wadesboro. Dr. C. F. Glenn of Rutherfordton was elected vice president, and Dr. H. C. Thompson of Shelby was re-elected secretary. Dr. Elias Faison of Charlotte is councilor of the Seventh District. Rutherfordton was tentatively selected as next year's meeting place.

The doctors' wives were entertained during the afternoon meeting by the Mecklenburg County Auxiliary, and were guests at the banquet in the evening.

## EIGHTH DISTRICT MEDICAL SOCIETY

The Eighth District Medical Society met in North Wilkesboro on October 30. The scientific program in the afternoon included papers by Drs. H. H. Bradshaw and George T. Harrell of Winston-Salem, Dr. Joseph B. Stevens of Greensboro, and Dr. John A. Ferrell, executive secretary of the North Carolina Medical Care Commission. Mr. John W. Clay of Winston-Salem was the speaker at the dinner meeting.

Officers elected for 1948 were Dr. Joseph B. Stevens of Greensboro, president; Dr. R. B. Davis of Greensboro, vice president, and Dr. M. D. Bonner of Jamestown, secretary-treasurer. Outgoing officers, all of North Wilkesboro, were Dr. Fred C. Hubbard, president; Dr. James H. McNeill, vice president, and Dr. William L. Bundy, secretary-treasurer. Dr. McNeill is also councilor of the Eighth District.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

At the October meeting of the Edgecombe-Nash Counties Medical Society, held in Rocky Mount on October 8, Mr. P. K. Gravely, chairman of Rocky Mount's Hospital Fact-Finding Committee, spoke on "Our Community's Present Hospital Status." The report of the blood bank committee was heard, and the following resolution adopted:

"RESOLVED: That a committee appointed by the president of the Society be authorized by the Society to attempt to accomplish the following:

"(a) Contact the civic clubs in the community and select one to actively sponsor a project to be known as the Community Blood Donor Service.

"(b) In cooperation with this group, work out a service making available whole blood from volunteer donors to patients at no cost to the patient for the blood except where specifically requested by the donor and recipient.

"(c) Contact the local chapter of The American Red Cross and make whatever arrangements they will to keep the lists of donors available at all hours and to all who may be in need of blood.

"(d) Contact the Rocky Mount Academy of Medicine and secure their cooperation in securing a panel of Negro donors. Assure this group that the Blood Donor Service is available to all persons.

"(e) Invite the cooperation of neighboring communities in obtaining panels of donors, which, when the occasion demanded, would be mutually available.

"(f) Act as an advisory group to provide whatever professional advice is necessary to the civic group actively sponsoring the project.

"(g) Report quarterly to the Society as to the status of the service."

President D. L. Knowles has appointed Dr. William Smethie to collaborate with the Business and Professional Women's Club concerning a cancer center in Rocky Mount. Drs. K. D. Weeks, M. L. Stone, and J. F. Crumpler have been appointed as the program committee.

## FORSYTH COUNTY MEDICAL SOCIETY

Dr. W. Z. Bradford of Charlotte was guest speaker at the October meeting of the Forsyth County Medical Society, held in Winston-Salem on October 14. His subject was "Breech Presentation."

## HALIFAX COUNTY MEDICAL SOCIETY

Dr. W. C. Winn of the Medical College of Virginia spoke on "The Rh Factor in Obstetrics" at the regular monthly dinner and meeting of the Halifax County Medical Society, held in Roanoke Rapids on October 10.

## NEWS NOTES

Dr. John M. Andrew, former fellow in radiology at the Cook County Hospital in Chicago, has announced the opening of offices for the practice of radiology in Lexington.

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Dr. Claude A. McNeill, Jr., has opened offices in Elkin for the practice of medicine. Dr. McNeill is a graduate of the Bowman Gray School of Medicine and, following his discharge from the army in October, 1946, took a postgraduate course in obstetrics and gynecology at the Baptist Hospital.

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Dr. Paul E. Simpson has announced the opening of offices for the practice of obstetrics and gynecology in Raleigh. Following his graduation from the Duke University School of Medicine, he spent five years in specialty training at Duke Hospital and two years on active duty with the U. S. Navy.

## INTERNATIONAL COLLEGE OF SURGEONS

The following doctors were among the 810 surgeons inducted into the United States Chapter of the International College of Surgeons, at the twelfth assembly and convocation, held in Chicago on October 3:

**Fellows:**

Dr. James G. Faulk, Monroe
Dr. Raymond L. Pittman, Fayetteville
Dr. Lance Truman Monroe, Concord

**Associate:**

Dr. Edward C. Jenkins, Pinehurst

## SOUTHERN PSYCHIATRIC ASSOCIATION

Among the speakers at the meeting of the Southern Psychiatric Association, held in Birmingham, Alabama, October 13 and 14, were Drs. Leslie B. Hohman and Robert N. Creadick of Durham and Drs. Lloyd J. Thompson and Richard L. Masland of Winston-Salem.

## YOUR DIRECTORY INFORMATION CARD

Preparations are now being made to publish the new, eighteenth edition of the **American Medical Directory**! The last edition of the Directory was issued late in 1942. Since that time, it has been impossible to publish a new edition because of wartime restrictions and the shortage of paper and labor.

About November 15, a directory card will be mailed to every physician in the United States, its dependencies, and Canada, requesting information to be used in compiling the new directory. Physicians receiving an information card should fill it out and return it promptly whether or not any change has occurred in any of the points on which information is requested. It is urged that those physicians also fill out the right half of the card, which information will be used exclusively for statistical purposes. Even if a physician has sent in similar information recently, he should mail the card promptly to insure the accurate listing of his name and address. There is no charge for publishing the data nor are physicians obligated in any way.

The Directory is one of the most important contributions of the American Medical Association to the work of the medical profession in the United States. In it, as in no other published directory, one may find dependable data concerning physicians, hospitals, medical organizations and activities. It provides full information on medical schools, specialization in the fields of medical practice, memberships in special medical societies, tabulation of medical journals and libraries, and indeed, practically every important fact concerning the medical profession in which anyone might possibly be interested.

Therefore, should any physician fail to receive one of these Directory Information cards by December 1, he should write at once to the Directory Department requesting a duplicate card be mailed.

## REVIEW COURSES OFFERED BY THE TULANE UNIVERSITY SCHOOL OF MEDICINE

Short review courses on the following subjects are being offered this year by the Division of Graduate Medicine of the Tulane University School of Medicine, New Orleans:

Pediatrics—November 17-21
Electrocardiography—January 5-17
Gynecology—January 5-10
Obstetrics—January 12-17
Internal Medicine—January 19-31
General Surgery—March 15-20
Gastroenterology—March 1-6
Pediatrics—March 8-12

Detailed information will be furnished by the Director of the Division of Graduate Medicine, 1430 Tulane Avenue, New Orleans 13, Louisiana.

## ATLANTA POSTGRADUATE MEDICAL ASSEMBLY

The Fulton County Medical Society announces a three-day Postgraduate Assembly to be held in Atlanta January 28, 29 and 30, 1948, immediately following the Regional Meeting of the College of Surgeons. Because of the College of Surgeons meeting, surgical subjects will not be emphasized in this Assembly. The program has been arranged to help the average doctor keep abreast of the newer developments, but it is believed it will offer something of value to every man and woman practicing medicine in the Southeast.

The College of Surgeons invites all physicians in this region to their meeting, the expenses of which will be met by the College. The Postgraduate Assembly will have to require a registration fee.

The list of speakers is the best assurance of the excellence of the Assembly:

Dr. Lester Dragstedt, Professor of Surgery, University of Chicago

Dr. Chester S. Keefer, Professor of Medicine, Boston University

Dr. A. C. Ivy, Professor of Medicine, Northwestern University

Dr. Helen Taussig, Johns Hopkins University

Dr. Julius Lempert, New York City

Dr. Philip S. Hench, Mayo Clinic

Dr. E. von Hamm, Professor of Pathology, University of Ohio

Dr. Ralph M. Tovell, Hartford, Conn.

Dr. Robert Elman, Washington University, St. Louis

Dr. Tom D. Spies, Professor-Elect of Medicine, Northwestern University

Dr. Merrill C. Sosman, Clinical Professor of Roentgenology, Harvard Medical School

## SOUTHEASTERN ALLERGY ASSOCIATION

The third annual meeting of the Southeastern Allergy Association will be held in Richmond, Virginia, on January 17 and 18 at the Jefferson Hotel.

## RADIOLOGICAL SOCIETY OF NORTH AMERICA

More than 800 members of the Radiological Society of North America—medical specialists in x-ray and radium—are expected to attend the thirty-third annual meeting of the society at the Hotel Statler in Boston, November 30 to December 5, 1947.

## UROLOGY AWARD

The American Urological Association offers an annual award of $1000.00 (first prize of $500.00, second prize $300.00 and third prize $200.00) for essays on the result of some clinical or laboratory research in urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals.

The first prize essay will appear on the program of the forthcoming meeting of the American Urological Association, to be held at the Hotel Statler, Boston, Massachusetts, May 17-20, 1948.

For full particulars write the secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee. Essays must be in his hands before March 1, 1948.

## NATIONAL GASTROENTEROLOGICAL ASSOCIATION 1948 AWARD CONTEST

The National Gastroenterological Association again takes pleasure in announcing its Annual Cash Prize Award Contest for 1948. One hundred dollars and a Certificate of Merit will be given for the best unpublished contribution on gastroenterology or allied subjects. Certificates will also be awarded those physicians whose contributions are deemed worthy.

Contestants residing in the United States must be members of the American Medical Association. Those residing in foreign countries must be members of a similar organization in their own country. The winning contribution will be selected by a board of impartial judges and the award is to be made at the Annual Convention Banquet of the National Gastroenterological Association in June of 1948.

Certificates awarded to other physicians will be mailed to them. The decision of the judges will be final. The Association reserves the exclusive right of publishing the winning contribution, and those receiving certificates of merit, in its official publication, **Review of Gastroenterology.**

All entries for the 1948 prize should be limited to 5,000 words, be typewritten in English, prepared in manuscript form, submitted in five copies, accompanied by an entry letter, and must be received not later than April 1, 1948. Entries should be addressed to the National Gastroenterological Association, 1819 Broadway, New York 23, N. Y.

## PAN-AMERICAN CONGRESS OF OPHTHALMOLOGY

Plans have been announced for the Third Pan-American Congress of Ophthalmology, which is to be held in Havana, Cuba, January 4 to 10, 1948. It is anticipated that about 1,000 eye specialists will attend the sessions at the University of Havana School of Medicine.

A program of more than forty formal papers has been arranged, with speakers divided about equally between physicians of the northern half of the hemisphere and those of the Latin American countries. Papers presented by English-speaking ophthalmologists are to be discussed by their colleagues who speak Spanish, Portuguese or French, and the papers in the Latin languages will be discussed by members of the English-speaking contingent. During the presentation of each paper, slides bearing resumes of one other language will be shown, in order to facilitate understanding by those who are unfamiliar with the language used by the speaker.

In addition to the contributions by members, there will be several by specially invited guests, including Sir Stewart Duke-Elder of London, Dr. Elizabeth Cass of Gibraltar, Prof. A. Fuchs, a renowned Viennese ophthalmologist now living in Shanghai, and Dr. Hermenegildo Arruga of Barcelona, Spain. Dr. Derrick T. Vail, professor of ophthalmology, Northwestern University Medical School, Chicago, will deliver the Harry Gradle Lecture in honor of the founder and first president of the congress.

Besides the formal addresses, a series of instructional courses has been planned for the congress, following the plan successfully used for many years by the American Academy of Ophthalmology and Otolaryngology. There will be thirty courses in English, five in Portuguese, and fifteen in Spanish, presented in the mornings of January 6, 7, and 8.

(BULLETIN BOARD CONTINUED ON PAGE 749)

# AUXILIARY

Are doctors' wives sufficiently aware of some of the more general conditions affecting the medical profession? There are some vital things being brought to the attention of the public through various sources about which they should be well informed.

As an example, not long ago a lady was defending socialized medicine because she felt it was the only method which would provide medical care for the masses. She had not heard of prepaid medical care such as that offered by the Hospital Saving Association of North Carolina at a cost which the lowest-salaried worker can afford—a plan for *voluntary* rather than *government-controlled* medical care for the masses. She was quite impressed when she was told about it. Not nearly enough people know about the Blue Cross plan for prepayment of medical care, even though statistics show that this state ranks seventh in the nation in the number participating in its benefits. Every doctor's wife should be able to present this plan intelligently. For this reason your program committee is urging you to study the plan so that you will be familiar with it.

Another phase of the program suggests that we all be informed about the contents of the health bill which was passed by the 1947 legislature, as well as other bills which would aid the profession and its interests as a whole. An editorial in the *Greensboro Daily News* for October 7 calls attention to the fact that the loan fund established for medical students two years ago has been used very little. In fact, according to the *Asheville Citizen*, only one loan has been made. The *News* raises the question as to why this fund has not been used in this state to the same extent that it has in Mississippi, where there is a similar law. Isn't it possible that not enough students know about it? Perhaps we could bring it to the attention of groups in which we are active. Its use no doubt would help in some degree to solve the need for doctors in rural areas, and there are in all probability some young men who would study medicine if they knew that this help is available. Mississippi gave it a great deal of publicity.

Then there is the shortage of nurses! We hear it from doctors, patients, their relatives, and interested friends. In *The State* magazine for October 4, Carol Dare mentions it on her page, "Merely a Woman's Opinion." The scholarship of $400 to $500 mentioned by Miss Virginia Miles, Counselor of the State Nurses Association, for some worthy student nurse is a worthwhile project for any auxiliary or civic club.

Some of you by now have met Miss Alice Geraldine Maxwell, "Miss North Carolina Student Nurse of 1947." I am sure you have found her charming, as will the high school girls when they hear her talk and meet her at the teas which are being given in her honor by the medical auxiliaries in the cities where she is making her appearances. The doctors' wives of these communities will have a wonderful opportunity to follow up interest which she arouses, and perhaps see that a scholarship is provided if some suitable student is interested but feels she cannot afford to enroll as a student nurse.

If Auxiliary members will reserve a little of their reading time for studying some of these pertinent problems, they will certainly see the many needs and they will become *informed* and therefore better able to carry the necessary information to groups with which they are associated. If those of you who are interested enough to read this page, as well as *The Bulletin* and other magazines on matters of medical interest, will attempt to create interest in others, it will help to spread the needed information.

Last, but far from least, let us not forget the social side. We all know that a doctor's duties allow him to spend all too little time with his family. Could we be just a little selfish about this one interest, and foster, to the utmost, family activities, as well as associations with friends and groups in our communities? Our husbands need us. Their families and friends need them.

And so let the program for the year unfold—with Auxiliary members filling their places as informed members of their communities and being the hub around which the wheel of family life is built, as well as the rim which holds its many spokes together.

Mrs. Harry L. Johnson,
Elkin
Chairman of the Program Committee.

# BOOK REVIEWS

**Clinical Methods of Neuro-Ophthalmologic Examination.** By Alfred Kestenbaum, M.D., 384 pages. Price, $6.75. New York: Grune and Stratton, 1946.

This book will be a very valuable reference for neurologists and neurosurgeons. Although the book begins with a chapter on "Anatomy of the Optic Pathway," the author takes extensive basic knowledge for granted. This limits the book's usefulness somewhat for the physician not familiar with detailed ocular physiology and inexperienced in methods of neurologic ocular examination.

The extensive information presented is well organized. There is a useful glossary and index. The bibliography is lengthy, but most of the references are in German and all but two are to works published prior to 1942.

This book has been written with such a rare economy of words that virtually every sentence conveys information. This condensation makes reading slow but learning fast. Authors of many medical texts would do well to study Kestenbaum's style.

**Essentials of Pharmacology.** By Frances K. Oldham, M.Sc., Ph.D., Research Associate in Pharmacology, The University of Chicago; F. E. Kelsey, Ph.D., Associate Professor of Pharmacology, The University of Chicago; and E. M. K. Geiling, Ph.D., M.D., Frank P. Hixon Distinguished Service Professor and Chairman of the Department of Pharmacology, The University of Chicago. 440 pages. Price, $5.00. Philadelphia: J. B. Lippincott Company, 1947.

The University of Chicago pharmacologists have produced an excellent concise survey of pharmacology. The book is modern, covering the new antihistamine drugs, the antibiotics, pteroylglutamic acid, nitrogen mustards, radioactive phosphorus, dolophine, and many other new preparations. The well organized bibliographies are unusual for a textbook in that the references are very recent, many of them being from 1947 publications.

In compiling a short book it is always difficult to know where to abbreviate. The authors wisely included little material on therapeutics, which occupies a small place in an introduction to pharmacology. It appears to this reviewer that the discussions of the cardiac glycosides, antacids, and cathartics are a bit brief. In general, however, the condensation of material has been very well handled, and the brevity—an invaluable attribute in a textbook—more than compensates for these minor criticisms.

The book has been printed on rough paper in large type—a pleasant change from the slick paper and small type all too commonly used in medical textbooks.

**A New Test for the Detection of Color Blindness.** By P. B. Wiltberger, M.D. 19 pages. Price, $4.00. Columbus, Ohio: Long's College Book Company, 1945.

This monograph offers a different and perhaps more physiologic method of determining color blindness than has heretofore been available. It is based on the "after-image" phenomenon for colors, and is performed by matching color chips with the after-images formed after gazing at other color chips. Thus no knowledge of colors is required, and it is practically impossible to memorize the test. Its greatest value is in distinguishing true color blindness—and especially red-green blindness—from color weakness, since a person who is blind for any color will see no colored after-image after gazing at that color. Color weakness is evaluated probably less accurately by the time required for the colored after-image to be formed.

The highly physiologic nature of the test commends it, but its chief disadvantage would seem to be the greater time required for its performance and the greater difficulty in getting across to the patient what is desired of him in the test. It is felt that these factors will make tests of the nature of the Ishihara charts still the more useful for routine testing. Where extreme accuracy is needed, however, this test is a fine adjunct.

A shorter form of the test, sold by the same publishers for $1.00, appears ample to meet most testing needs.

**Epilepsy; Psychiatric Aspects of Convulsive Disorders.** The Proceedings of the Thirty-Sixth Annual Meeting of the American Psychopathological Association. Edited by Paul H. Hoch, M.D., New York State Psychiatric Institute, and Robert P. Knight, M.D., The Meninger Clinic, Topeka, Kansas. 214 pages. Price, $4.00. New York: Grune & Stratton, 1947.

This book includes contributions by twenty-one different authors and deals with a number of different aspects of the convulsive disorders. It includes sections on the history of epilepsy, the principles of drug treatment and of psychiatric treatment, the incidence of epilepsy, the results of Rorschach and other mental tests in the convulsive states, the psychopathologic aspects of epilepsy, exerimentally produced convulsions in animals, and the electroencephalogram in epilepsy.

The book has several characteristics inevitable in any symposium of this sort. The work is uneven, the quality of each chapter depending on the ability of the contributor. In addition, the book tends to be spotty in its coverage, dealing with certain narrow aspects of the convulsive disorders as seen from the particular viewpoints of certain individuals. The section on "Social Implications and Management," for example, deals chiefly with desirable changes in our institutional care of epileptic patients, and only briefly discusses the many problems faced by the general practitioner who is forced to treat the epileptic patient in the community.

The chapter on "The Personality of the Epileptic" deals almost exclusively with the results of Rorschach study, which again is of little value in aiding in an over-all understanding of the individual. The chapter on "Psychopathology of Epilepsy" is an analytic interpretation of epileptic reactions, which appears to be quite narrow in its outlook.

As a collection of papers dealing with important recent research relating to the convulsive disorders, this book is extremely stimulating to the physician especially interested in the convulsive states. The book could fill a desirable position in emphasizing the importance of mental disturbances in patients suffering with convulsive disorders, but it is to be feared that the coverage of this particular part of the problem is not adequate to provide any practical aid in actually dealing with such patients. For this reason, its value to the general practitioner interested in a broad understanding of the psychiatric aspects of convulsive disorders will be limited.

# BULLETIN BOARD

(CONTINUED FROM PAGE 746)

## Human Betterment League of North Carolina

The following questionnaire on sterilization is being distributed by the Human Betterment League of North Carolina. Copies may be obtained by writing to the Human Betterment League of North Carolina, P. O. Box 3036, Winston-Salem, N. C.

### What Do You Know About Sterilization? North Carolina Is One of the Progressive States With Laws Providing for the Sterilization of the Mentally Unfit

Test your knowledge of this important health and social measure.

1. Is it possible for a sterilized man or woman to lead a normal sex life?
2. Is every case of insanity and feeblemindedness reported for sterilization to the North Carolina Eugenics Board carefully investigated before the operation is performed?
3. Will the state sometimes permit an insane or feebleminded person to adopt a child?
4. If a child does not inherit the mental defect of his parent can he be harmed by the parent's mental affliction?
5. Are over half of the hospital beds in North Carolina occupied by mental patients?
6. Did North Carolina's men receive a high rating for sound mental health during Selective Service examinations for the armed forces?
7. Can some types of insanity now be cured?
8. Are new cures being found for feeblemindedness?
9. Do feebleminded persons have few children because they are less fertile than normal ones?
10. Is sterilization usually done against the wishes of the patient or of the patient's family?

### Here Is the Truth about Sterilization and North Carolina's Laws Concerning It

1. **YES.** A sterilized man or woman can lead a completely normal, satisfying sex life because **sterilization removes nothing from the body.** The simple operation merely closes the tiny passages through which the life-producing cells must travel. The cells are absorbed by the body and the functioning of the sex organs is not affected in any way.
2. **YES.** North Carolina statutes provide special legal safeguards to prevent any abuse of this important law. A careful investigation is made by the North Carolina Eugenics Board of every case recommended by the heads of certain institutions, or by county superintendents of welfare. If the Board finds that sterilization is indicated it can order the operation performed at public expense.
3. **NO.** Placing a helpless child in the care of mentally unbalanced or deficient persons would be grossly unfair and could result in tragedy. No conscientious judge would permit a person suffering from mental illness or deficiency to adopt a child. It is equally tragic and unfair to permit children to be born to such parents, exposed to the double risk of questionable heredity and bad environment.
4. **YES.** It is possible for insane or feebleminded parents to give birth to mentally normal children, but such children are often psychologically affected for life by their home surroundings. Children reared by mentally deficient parents start life with an environmental handicap from which they may never recover.
5. **YES.** Mental cases occupy more than one-half of all the hospital beds in the State at an annual cost to the tax-payers of about $2,000,000. There are more persons in hospitals (2811 at the last report) suffering from the type of insanity known as schizophrenia (dementia praecox) than any other single disease! If insanity is permanent, sterilization can be extremely valuable in protecting its victims from undesirable parenthood.
6. **NO.** Selective Service rejections because of mental disease or deficiency were high throughout the war. In 1942 they accounted for 14% and during 1944 for 48% of the North Carolina men found unfit for military service.
7. **YES.** Insanity is mental illness, which frequently attacks persons who were entirely normal at birth. Medical science is learning more about ways to cure **some types** of insanity.
8. **NO. Feeblemindedness is not a disease** and therefore cannot be cured. Feebleminded patients are born with defective mental equipment which cannot be changed any more than the color of their eyes can be altered. With proper training some individuals can be taught to be reasonably self-reliant. They may even be self-supporting after marriage if protected from the responsibility and cost of rearing a family. Feebleminded girls are particularly in need of the protection of sterilization since they cannot be expected to assume adequate moral or social responsibility for their actions.
9. **NO.** Persons of low mentality are not less fertile than normally intelligent persons. Idiots and imbeciles seldom have either sexual or reproductive power, but morons, who far outnumber all other groups of mental defectives, are **doubling their number** with each generation.
10. **NO.** If the patient or his family feel that the operation should not be performed, **appeal to the courts is possible.** However, in almost all cases the operation is welcomed when it is understood that there will be **no detectable physical or mental change** except that children will not be produced.

A study made at the Alabama State School for the Feeblemindeed in 1945 showed that out of 1429 patients, 553 had been born of feebleminded parents, and another 87 patients had had at least one parent hospitalized for insanity.

Was anything gained by the birth of these 640 children doomed from the start to empty, meaningless life in an institution for mental defectives?

The National Resources Committee reporting on the alarming increase of mentally deficient and handicapped persons in this country, stated:

> "The proportion of persons handicapped by hereditary deficiencies might be reduced by intelligent social action . . . It seems clear that the prevention of reproduction by persons handicapped by severe mental deficiency or by disabling physical conditions, that appear to be hereditary, is socially desirable."

North Carolina is a leader among the progressive states which have provided the legal framework for such desirable social action.

We have the law! It is up to every North Carolinian to understand that law and support it!

## MEDICAL WOMEN'S LIBRARY COMMITTEE

November 7 has been designated as Blackwell Day, in honor of Elizabeth Blackwell, the first woman in the world to receive an M.D. degree. The Medical Women's Library Committee of the American Medical Women's Association is observing this day by requesting donations to the Medical Women's Library, Woman's Medical College, Philadelphia, Pennsylvania. The donations should be in the form of one or more books by or about women in science, or checks to be used for the purchase and collection of such books.

## MOTION PICTURE FILMS

To assure the listing of all outstanding medical and surgical motion picture films in the revised "Catalogue of Professional Motion Picture Films" now being compiled, all film authors are urgently requested to write immediately for film questionnaires to be filled out and returned. All members of the profession are invited to cooperate with this undertaking by forwarding this announcement to an author or by furnishing the film title and full name and address of any film author. Send information to: Academy-International of Medicine, 214 West Sixth Street, Topeka, Kansas.

## NEWS NOTES FROM THE SURGEON GENERAL'S OFFICE

### Army Personnel to Receive 'Flu' Vaccine

Vaccination of all military personnel against influenza will begin during October, and those entering the service prior to April 1, 1948, will receive influenza vaccine along with their initial immunizations. Precautions will be taken to avoid administering influenza vaccine to persons having a history of egg allergy. In addition to the A and B viruses the vaccine contains an A-variant cultured from the distinctive type of influenza that occurred at Fort Monmouth, N. J., last season. Inasmuch as a new strain was isolated last year, it is possible that other new strains may be demonstrated this year. The Army is on a lookout for any new strains that may occur.

## VETERANS ADMINISTRATION

Appointment of Dr. Arden Freer of Washington, D. C. as deputy medical director of Veterans Administration was announced recently by Dr. Paul R. Hawley, VA's chief medical director. Dr. Freer succeeds Dr. Robert C. Cook, who requested transfer to Colorado, where he will be manager of the VA hospital at Fort Logan. Dr. Roy A. Wolford, assistant chief of VA's Tuberculosis Service, has been named acting executive officer of professional services, pending permanent appointment of a successor to Dr. Freer.

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Dr. Donald A. Covalt, chief of Veterans Administration physical medicine rehabilitation service, has resigned, effective November 15, to become associate professor of physical medicine and rehabilitation in the New York University School of Medicine and also head of NYU's new Rehabilitation Institute. Dr. A. Ray Dawson, for the past year and a half head of the physical medicine rehabilitation service in the Richmond, Va., Branch Office of VA, has been named to succeed Dr. Covalt.

* * * *

Appointment of Dr. Paul B. Magnuson, former professor of surgery and chairman of the Department of Bone and Joint Surgery at Northwestern University Medical School, Chicago, as acting chief of Veterans Administration Professional Services, was announced recently by VA. Dr. Edward Harvey Cushing, former associate clinical professor of medicine at Western Reserve University, Cleveland, O., will succeed Dr. Magnuson as chief of the Research and Education Service.

### Eighty Years of Marriage and Divorce Statistics in the United States

Six times as many marriages took place in the United States in 1946 as in 1867, and 60 times as many divorces occurred in 1946 as in 1867, according to figures covering the 80-year period contained in a report released recently by the National Office of Vital Statistics, Public Health Service, Federal Security Agency.

**Smith, Kline & French Laboratories** of Philadelphia, pharmaceutical manufacturers, announce the appointment of Maurice L. Moore, Ph.D., as director of research laboratories, succeeding the late Dr. Walter G. Karr. Dr. Moore comes to SKF from Frederick Stearns & Company, where he was assistant director of research.

Buy Christmas Seals

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# SOME PSYCHOSOMATIC PROBLEMS IN GYNECOLOGY

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DURHAM

No physician can avoid being in part a psychologist, no matter how he may try. Good gynecology is often concerned with what *not* to do as much as with what to do. I fear that many physicians would define gynecology as surgery of the female organs. Others may include in the definition the treatment of diseases of the pelvic organs, but exclude all mental and emotional problems. Gynecology should properly be defined as the study of the whole woman—that is, the mind and body.

I am neither a psychosomaticist nor a psychiatrist. This paper represents a crude exposition of the impressions obtained in the practice of gynecology, as well as from discussions with older gynecologists who have learned by experience some of the inexplicable peculiarities in the mental processes of their patients, and from talks with psychiatrists who make psychiatric sense and not nonsense.

Most physicians recognize that there is a large psychic element present in cases of mucous colitis (irritable colon), peptic ulcer, neurodermatitis, psychogenic rheumatism, bronchial asthma, and migraine. A psychologic state may be entirely responsible for the diseases; or the psychologic state may be either secondary or contributory to these illnesses. If I have a carbuncle on my upper lip, one will refer to it as a physical disease, but is not my mental outlook changed by it? Of course it is.

Why is it that if you operate on three patients for complete prolapse of the uterus, the same procedure being performed on each, one will recover completely, another will improve, while the third will state that she has had no relief from her symptoms?

Numerous authors have called attention to the prevalence of pelvic symptoms and signs of psychogenic origin. "Psychosomatic medicine" has become a common term since the war, and there have been revolutionary changes in the study and clinical application of psychology and psychiatry. Gynecologists have taken little or no advantage of these studies, however.

It would be impossible to discuss, in a fifteen-minute paper, all the pelvic syndromes of psychogenic origin. The ones which will be considered are: psychogenic amenorrhea, dysmenorrhea, and dyspareunia and frigidity. Neurodermatitis of the vulva, the menopause, involutional melancholia, cancerphobia, and many other syndromes will not be included in this discussion.

### *Psychogenic Amenorrhea*

Emotional strain may cause menstruation to cease for months. Repeatedly we have seen menstrual dysfunction in nurses and coeds away from home for the first time. There is a recent case history of a young coed who was told that her amenorrhea was due to a physiologic cause—namely, pregnancy. She committed suicide, and an autopsy revealed no evidence of the gravid state. I was told by gynecologists in London that many women ceased menstruating during the German "blitz" of 1940.

Menstruation may cease after the death of a husband or lover, after a narrow escape from an automobile accident, and after quar-

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Read before the Section on Obstetrics and Gynecology, Medical Society of the State of North Carolina, Virginia Beach, Virginia, May 14, 1947.

From the Department of Obstetrics and Gynecology of the Duke University School of Medicine, Durham, North Carolina.

rels involving great emotional tension. The cycle may frequently be re-established with reassurance by the physician that nothing is organically wrong, and with psychotherapy. Psychotherapy is nothing but personal tutoring.

Reinfenstein⁽¹⁾ attempts to explain psychogenic amenorrhea as being of hypothalamic origin. He believes that emotional disturbances block the hypothalamic impulses. The ovarian follicle fails to receive sufficient luteinizing hormone, and although it is affected by the follicle-stimulating hormone, it does not produce sufficient estrogen, and the endometrial changes responsible for menstruation cannot occur. His criteria for a diagnosis of psychogenic amenorrhea are:

1. Evidence of psychic trauma just before the menses stopped.
2. Laboratory data indicating that the pituitary gland and ovaries are not primarily involved.
3. Absence of estrogenic effect on pelvic tissue, as proved by endometrial biopsy, vaginal smear, and failure to bleed after receiving progesterone for five days.
4. Endometrial bleeding after withdrawal of estrogens.

There is another interesting type of psychogenic amenorrhea — pseudocyesis. It is usually observed in younger women who intensely desire offspring, or in women near the menopause. These patients may exhibit all the subjective symptoms of pregnancy, associated with a considerable increase in the size of the abdomen, breast changes, and even enlargement of the uterus. Not long ago, a patient was brought to the hospital by her physician, who told us that the onset of labor occurred six hours before and that he had followed her prenatally for eight months. Pelvic examination revealed a normal-sized uterus. A flat plate of her abdomen was negative. Her "labor pains" and "fetal movements" were attributed to gas in the intestines. You can well imagine the difficulty of persuading this patient that she was not pregnant.

### *Dysmenorrhea*

A few years ago, a young, unmarried, 22-year-old woman came to me complaining of periodic lower abdominal pain. Her past gynecologic history was a revelation. Briefly, it was as follows: At the age of 18 years she went to a surgeon complaining of painful menstruation since the menarche. She was told that her dysmenorrhea was due to a retroverted uterus. Hysteropexy was advised and was carried out. The dysmenorrhea persisted. She was then told by the same physician that her uterus had been placed in a too-anteverted position, and a second laparotomy was performed, placing the uterus in midposition. The dysmenorrhea continued, and when she was 21 years of age, the surgeon performed a supravaginal hysterectomy. Is this one of the reasons that Philip Wylie in his book, "Generation of Vipers," labeled the physician an "Uncommon Man"?

Recently a 17-year-old freshman coed arrived at the hospital in a very tense state, asking "What is wrong with me? I do not have any pain with my monthlies. There must be something seriously wrong with me, because my mother always went to bed with her periods and now my roommate is doing the same!"

There is general agreement that psychic factors play a major role in much dysmenorrhea. Inadequate mental preparation for adolescence may result in poor psychic orientation to the physiologic cyclic phenomena. How can a sexually prejudiced, somatically insufficient, dysmenorrheic mother fail to raise a dysmenorrheic daughter, especially when the mother has repeatedly referred to menstruation as "the curse," "the Willies," "falling off the roof," or "being unwell"? Not infrequently dysmenorrhea represents a mechanism of escape from the environmental, social, or domestic situation, or a psychosomatic rebellion against some such situation.

An excellent test to confirm psychogenic dysmenorrhea is to give estrogens throughout one cycle and prevent ovulation. If the patient has dysmenorrhea from anovulatory bleeding and no other organic cause is found, it is evident that her dysmenorrhea is psychic.

### *Dyspareunia and Frigidity*

In spite of the frequency of sexual intercourse, normal coitus is a very complex action, involving anatomic, physiologic, nerv-

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1. Reinfenstein, E. C., Jr.: Psychogenic or Hypothalamic Amenorrhea, M. Clin. North America 30:1103-1114 (Sept.) 1946.

ous, biologic, and, most of all, psychologic factors. Abnormalities of one or more of these factors may bring about a condition in which intercourse is painful or unpleasant. It is in the mental distaste for or revulsion against intercourse that many psychosomatic syndromes originate.

Here are some other well known facts: less than 5 per cent of women have a sexual appetite even approaching that of the male; more than 60 per cent of them never achieve orgasm until after the birth of a child; about 25 per cent never reach an orgasm; and about 10 per cent never derive any sense of pleasure whatsoever from intercourse.

The effects of the mode of life of the majority of American women are such that one wonders that there are as many biologically healthy women as there are. These effects are described by Dr. Willard Cooke as follows(2):

> "The wife of a man with an average or better than average income has so little to do that she is more or less continuously bored; boredom leads to restlessness, restlessness to mental and nervous hypertension which expresses itself in functional neuroses, irritability, introspection, and the expenditure of tremendous excess of nervous energy in the performance of any physical or mental task. All of this leads to nervous fatigue and neurasthenia. The average woman who has driven her children to school, planned the day's menus, instructed her servants and repaired some trifling damage to her wardrobe must go to bed after lunch and rest before the arduous task of an afternoon at the bridge table. Knowing the exhaustion which attends the performance of such things, she feels she cannot survive the exertion attendant upon a game of golf or tennis, a swim, or a ride on horseback. As a result, her muscles become flabby, fat accumulates, the general tonus is reduced to a minimum, the functional activities of the body are impaired, and functional neuroses reign unopposed."

In attempting to arrange a normal regimen of life for these unfortunate neurotics, Dr. Cooke found that over 90 per cent refused to cooperate, nearly 80 per cent asked whether some operative procedure might not be substituted, and more than 50 per cent said they would rather remain sick!

The problem of dyspareunia is always an individual one, and one which can be approached only after the doctor-patient relationship has been fully established. After the confidence of the patient has been obtained, it is remarkable how often merely telling her troubles and experiences will dramatically relieve the patient. The psychiatrist speaks of this as "ventilation of hostility" toward her husband, lover, or some other individual.

Repeatedly the patient states that she is "trapped." Giving the patient insight may help her free herself. Occasionally the circumstances are such that it is impossible for the individual to become free. A young blonde of 26 years recently came to me complaining of dyspareunia and pain in the right lower quadrant. She was married to a paratroop officer in the regular army. During the physical examination it was noted that she had a "black eye" and ecchymoses of the ear. Inquiry as to the cause of this resulted in the following outburst of hostility: "My husband is a beast. He gave me this today when I refused to have intercourse with him before coming to see you; he is always doing this. I left him after the first year but remarried him later; now I am trapped. We have a 5-year-old daughter, and I have no means to support her. I can make my own way, but I cannot leave my daughter with him. I have tried to work as a beauty operator and manicurist, but he was jealous of every man that was a patron of mine. I hate him." This girl has a decision to make. She cannot remain in a state of indecision. Whether she leaves her husband or decides to remain with him, she will be forced to give up something. I endeavored to push her to make a decision before she "cracked up."

Frigidity is very common. The later in life a woman has her first sexual experience, the more apt she is to be frigid. Fear of pregnancy is a very common cause. Parental solicitude for the virginity of a daughter often is the breeding ground of frigidity. Instead of explaining to the girl that she has sexual instincts and libido, the gratification of which should be postponed until her marriage, according to the dictates of society, the girl is told that she will contract a horrible venereal infection or that she will have a bastard child.

There is an amazing ignorance of normal sex function among girls and boys. While at Henry Ford Hospital with Dr. J. P. Pratt, I had the pleasure of giving health talks to groups of high-school students. They were asked to write anonymous questions and were assured of honest answers. Dr. Pratt(3) has listed a few of the questions that girls of 16, 17, and 18 asked us:

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2. Cooke, W. R.: Essentials of Gynecology, Philadelphia, J. B. Lippincott Co., 1943, ch. 4.

3. Pratt, J. P.: Psychosomatic Gynecology, J. M. Assoc. Georgia 35:243-250 (Sept.) 1946.

1. How does drinking intoxicants affect the sex organs?
2. Is it wrong to neck?
3. If a girl goes horseback-riding and there is a bloody discharge later, does it mean that her main head is broken?
4. How messy is it after a baby is delivered?
5. What would happen if a girl had sexual intercourse before she began to menstruate?
6. Is there pain when a girl has her first intercourse?
7. What are the circumstances when there is an affair between two men or two women; or is this idea just plain batty?
8. Is a man's desire for mating so great that he doesn't care what race, color, or creed the woman is?

These are questions from high-school students of better-than-average intelligence. Why don't these girls get honest answers at home? The answer is that their parents do not know, do not have the vocabulary, and are not interested. It might require some reading and study.

### *Conclusion*

In the investigation of a gynecologic problem we should always have an awareness of the role that the emotions play in illness. Keen attention should be paid to the behavior of the patient and to the actual words that she uses in describing her complaints. Note-taking should be kept at a minimum, so that the patient will feel free to talk. Make her feel that you are more interested in her than in recording her history. Show interest and sympathy for her complaints, even though they may be trivial or silly.

A half-doctor, who eliminates the psychologic aspects of disease and concentrates only on the somatic component, will leave his patients in a more deplorable state than ever after his carving and treatment of their innocent genitalia. As gynecologists, we cannot refer every one of these patients to psychiatrists. There never will be enough psychiatrists to treat the hundreds of thousands of psychoneurotics. By allowing a woman to protest to you, you may note a very rapid and striking improvement in her general state. Sometimes two to four office visits (instead of an operative procedure), during which time the physician allows the woman to express herself, is all that is needed. Eventually, the woman will protest to you about something that happened at home, or something that the husband has done; and when she gets it off her chest, she begins to feel better. Her weakness, her anxiety dreams, her depression, her irritability, her tremor, her dizziness, her insomnia, her lower abdominal pain, her nausea, her backache, her fatigability, her restlessness, her menstrual molimina, and her headaches may vanish. There is really more personal satisfaction in helping these individuals than in relieving a woman of the largest fibromyoma uteri or ovarian cyst on record.

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# TREATMENT OF DIABETES MELLITUS

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To cover the subject of diabetic treatment completely would require a very large book; therefore this paper is confined to a discussion of some of the more important facts. It is important for the general practitioner to be well versed in diabetes, and there is great need for emphasizing well-known facts about the disease.

There are about 15,000 diabetics in North Carolina, and the number is steadily increasing. This increase results from several factors—among them, a growing population, longer life expectancy, and better medical care. From a strictly eugenic standpoint, diabetics should not have children. By eugenic selection, it is theoretically possible almost to eliminate diabetes in a few generations. If both parents have diabetes, their children will almost certainly have it. If one parent has diabetes and the other has not, the chances of their children's having it vary widely according to the family history of the non-diabetic parent. The incidence of both diabetes and carriers of diabetic genes is higher than average among the grandchildren of a diabetic person.

### *Regulation and Instruction of the Patient*

All my diabetic patients, as soon as the disease is diagnosed, are advised to come into the hospital for regulation and instruction. On the first day, in the uncomplicated case, we put the patient on insulin, exercise, and a standard diet estimated to fit his needs. We test the blood sugar twice daily, before breakfast and before supper. We teach the patient to divide the 24-hour urine output

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into four specimens and test each separately. Protamine-zinc insulin is used in most cases, and globin insulin in almost all the others. Diet and insulin doses are adjusted concurrently by trial and error. This method is the quickest and achieves the best results; no better method has ever been devised. I do not mean trial-and-error by guesswork, but trial-and-error with the aid of accurate and frequently repeated scientific tests.

One must be sure that the directions given the patient are completely understood if these directions are to be carried out after the patient passes from under immediate supervision. Otherwise, the benefit from the best regulation in the world will be largely lost.

The patient, or his care-taker, is taught in our laboratory to test his urine and record the results. This record he shows to the physician on return visits. At first we require four tests a day, on the morning, afternoon, evening and night specimens. Later, when the patient is well stabilized, one test a day, usually on the night specimen, is sufficient unless some complication arises. Any complication, such as the appearance of a febrile disease, is the signal for returning to the full number of tests as well as for other precautions, such as watching for impending coma.

I wish to emphasize two other points. One is that it is not necessary to have the patient's urine entirely sugar-free to obtain the best practical results. I think the patient feels better and stronger if about a third of the urine specimens show a green Benedict test, and I don't worry over an occasional yellow test.

The other point concerns the handling of old diabetic patients. Very frequently we encounter old people with mild or moderate diabetes who have gone a long time with no control or inadequate control. Their bodies have become accustomed to blood sugar levels much higher than normal, and one must be extremely cautious in bringing their blood sugar down to levels usually considered normal. I remember one 78-year-old woman who had had mild diabetes for twenty years. Her blood sugar ranged around 250 to 270 mg. per 100 cc., and she showed unmistakable signs of insulin shock when the blood sugar was brought below 200. During the twenty years she had had diabetes, she had been on a very low-carbohydrate diet. By giving her a high carbohydrate intake, which she was very much afraid to take at first, over a period of three or four months, plus 10 units of protamine-zinc insulin a day, I was able to make her feel much stronger and better, but never was able to get the blood sugar below 220 without reaction.

### *Diet*

The problem of providing diets for diabetics has been made unnecessarily complicated and elaborate because an attempt is often made to fit the caloric intake too accurately to the height and weight of the individual. Such accuracy cannot be achieved unless we have the patient at all times under exacting laboratory control. People of the same height and weight do different work, and, depending on their temperaments, require varying amounts of energy for doing the same types of work.

Two Negro cooks I employed in my home at different times furnish a perfect example of the effect of temperament on food intake. One was phlegmatic, slow-moving, and deliberate; she never got hurried or excited, and moved smoothly from one task to another. The end of the day would show much work accomplished, but her food intake was about two thirds or half that of another cook I had who was nervous and excitable, and who moved quickly and in a jerky fashion, expending much unnecessary energy in her work. The age and height of the two Negroes were the same, but the more phlegmatic weighed 10 pounds more.

I have, therefore, considered it sufficiently accurate for practical purposes to provide myself with a series of standard diets, ranging in caloric value from 1200 to 2300 calories per twenty-four hours. These standardized diets provide the correct proportions of carbohydrate, fat and protein. I find that they fit the dietary requirements of about 85 per cent of my patients. At the beginning of treatment a diet is selected which, considering the patient's size, age, type of work and temperament, seems to fit him best. Thereafter, I am guided in raising, lowering, or altering the diet by the appetite, the sense of well-being, changes in weight, and other factors. If the patient is overweight, I increase the food intake enough to reduce his weight gradually, not more than 5 pounds a month. If he is underweight, the food intake is increased until a satisfactory weight is attained. We give more calories to a farm laborer than to a bookkeeper.

I think it is important for the patient to get the same caloric intake every day, after his requirements are determined. This aim can be accomplished only by weighing the food, for which purpose I provide each patient with a standard 500-gram food scale. It is impossible to regulate a patient correctly unless there is uniform food intake to balance a uniform insulin dose. I do not think it is impractical to insist on a weighed diet, and I do not think it is difficult for the patient to learn to weigh his food. Abundant variety is provided by a system of substitution. Our dietitian instructs the patient, or someone who is to prepare the food in the home, by lecture and demonstrations.

I hope and believe that the old method of giving diabetic patients a low-carbohydrate, high-fat diet is over. I am convinced that the normal carbohydrate intake, plus the optimum amount of exercise, delays arteriosclerotic changes longer than other regimens. Furthermore, the high, or normal, carbohydrate intake increases, over a period of time, the sugar tolerance of the diabetic. This finding refutes the former belief that the low-carbohydrate diet spares the islet cells. In only rare instances, in my experience, has the insulin requirement been increased by a high carbohydrate intake.

### *Exercise*

Physical exercise is beneficial to anyone, especially the diabetic, and I insist on it to the limit of the patient's tolerance. Exercise lowers the blood sugar, and it will be found that, other things being equal, the diabetic doing hard physical labor will do better and require less insulin than the sedentary diabetic. In older patients, the condition of the heart and circulatory system is an important factor to consider in prescribing work, and a close watch should be kept for the earliest danger signals of coronary disease.

### *Diabetes in Pregnancy*

Since insulin was introduced in 1922, the death rate from diabetes among pregnant women has declined, but the fetal mortality is still excessive. This too has been somewhat reduced during the past ten years, however, by correction of the hormonal imbalance occurring during pregnancy. The rise in serum gonadotropic hormone increases the danger of abortion during the second month of pregnancy, and greatly increases the danger of miscarriage during the sixth and seventh months. Treatment with estrogen and progesterone will prevent some abortions in the second month and some premature births as well as some cases of eclampsia and pre-eclamptic toxemia, and some stillbirths and prenatal deaths. The development of such abnormal conditions can in most cases be predicted three or four weeks before symptoms appear by a complex biologic test, using white rats. Since this test is not considered practical, except in the best-equipped laboratories, hormonal therapy may be given prophylactically during pregnancy with good results without harm to the mother or baby.

Diabetic women are generally thought to have larger-than-normal babies. This danger may possibly be averted by the hormonal treatment referred to above, plus restriction of weight gain and good control of the diabetes. No diabetic should gain over 20 pounds during pregnancy.

### *Diabetes in Children*

It is more difficult to treat diabetes in children than in adults. Children's blood sugars vary more rapidly and more widely, and they cannot be made to understand why they should have a routine different from other children. Most adult diabetics are overnourished at least at the onset, whereas most diabetic children are underweight. Furthermore, provision must be made in the child's diet for a normal increase in body size. Children exercise more and in a more irregular manner than adults. A dose of protamine-zinc insulin which would be correct today may cause an insulin reaction tomorrow, when the child exercises excessively in a back-yard baseball game.

### *Complications of Diabetes*

#### *Infection*

I believe that the danger of infection in diabetics is not so great as was once thought. Infection is no more apt to develop in a well-regulated diabetic than in a non-diabetic person. In old people, the circulation of the legs and feet is impaired by arteriosclerosis, and there is increased danger of severe infection and even gangrene. This is true whether or not the patient has diabetes, but diabetes, especially if poorly controlled, hastens arteriosclerotic changes. Since infection, especially if it is accompanied by fever, aggravates diabetes, all efforts should be made to avoid and control infections.

*Coma*

Diabetic coma is a medical emergency, equally as urgent and important as acute appendicitis, and in most cases requiring more therapeutic skill. The mortality ranges from a little below 12 per cent at the Joslin Clinic to around 50 per cent at one of the large municipal hospitals. Too much food, too little insulin, a sudden reduction in physical activity, infection, and febrile disease account for almost all cases of precoma hyperglycemia and acidosis.

In most cases the infection or febrile disease which caused the patient to go into coma is not difficult to diagnose, but the following case which I recently treated is an exception:

A 60-year-old woman, known to have had diabetes for ten years, was admitted in a stuporous condition with a blood sugar of 350. Knowing that fever is not present in uncomplicated coma, I searched for the cause while treating the coma. Two days later the patient was still unconscious, her blood sugar was still high, and her fever was ranging between 102 and 105 F., in spite of large doses of penicillin and insulin. She was rapidly getting worse. On admission two small infected wounds had been noted on one hand, and when I learned, two days after admission, that the patient had dressed a rabbit two days before the onset of her fever, I began to suspect tularemia. Re-examination showed some enlarged epitrochlear glands. The drug was immediately switched to streptomycin, and I had the extreme satisfaction of seeing her make a rapid and complete recovery. On the fourteenth day, three days after she had finished her full course of streptomycin, the agglutination test for tularemia was positive in a dilution of 1:320. Prior to the tularemia the patient had been taking no insulin for more than a year; since then she has required 10 units a day.

Each case of diabetic coma must be individualized and the patient must be carefully watched day and night. All such patients should be hospitalized, and treatment should be guided by frequent blood sugar determinations. I have called for as many as fifteen determinations during the first forty-eight hours, but that many are seldom necessary. I am not as afraid of large doses of insulin as I once was, but there is some danger of giving too much through over-anxiety. I have seen several patients pass from diabetic coma to insulin shock without regaining consciousness.

I use regular insulin intravenously and intramuscularly, aided by protamine-zinc insulin. The acidosis, dehydration, and hypochloremia are treated by liberal and frequently repeated doses of saline by vein and bowel. One or two saline enemas are usually necessary to empty the colon and to supply fluid. Catheterization should be done if necessary. Gastric lavage is helpful, and freqently yields a dark bloody fluid. Sixth molar lactate is valuable in cases of stubborn acidosis, particularly when the carbon dioxide combining power drops below 20 volumes per cent. I do not use sodium bicarbonate intravenously, chiefly because it is difficult to prepare and is not as effective or safe as sixth molar lactate.

Until the patient is able to take food by mouth, I frequently give glucose by vein for nourishment. Some authorities say that glucose should not be given in cases of diabetic coma. Even with a blood sugar of 600 mg. per 100 cc., however, there is only about 36 Gm. of glucose in the blood of an average adult, or about the amount of sugar contained in the juice of three and a half oranges. This would be adequate carbohydrate intake for only a few hours. Only a small amount of additional insulin is necessary to take care of the glucose administered intravenously, and the glucose is a safeguard against overshooting the mark and precipitating hypoglycemia.

*Arteriosclerosis and its complications*

At the present time, arteriosclerosis is the greatest threat to the diabetic patient. Since the introduction of insulin, deaths from arteriosclerosis in diabetic patients have risen 333 per cent and exceed by sixteen times the deaths from coma. These figures are, of course, influenced by the fact that diabetics now live longer to develop arteriosclerosis. However, diabetes unquestionably hastens hardening of the arteries.

The three most frequent complications of arteriosclerosis are coronary occlusion, cerebral thrombosis and hemorrhage, and diabetic gangrene of the lower extremities. The only prophylaxis for the first two is good diabetic care and hygiene. The same principles are important in the prevention of gangrene, but the main emphasis should be on improving and maintaining the circulation, on preventing infections, and on following certain principles in removing devitalized tissue. The extremities should be kept warm but not injured by overheating. A leg threatened by diabetic gangrene should be placed in a slightly dependent position, with the leg straight and the foot about four or five inches lower than the hip. Some good work has been done, especially in the Ochsner Clinic at New Orleans, toward improving the circulation in such extremities by blocking the lumbar sympathetic nerves by anesthetics or surgery. I have not had much success with passive vascular exercise machines, and I think that they should not be used in the presence of gangrene or infection.

If the extremity cannot be saved, the standard amputation procedures should be altered in many cases to fit the circumstances. It is necessary to remove all the necrotic tissue back to the point of free bleeding, but one should be careful in making a flap (if, indeed, a flap should be made in the presence of infection or gangrene) not to dam up secretions which may materially aid in the upward spread of the trouble.

In acute, rapidly ascending infections of the arm or leg, we have in a number of cases done guillotine amputations, cutting the extremity square off, leaving the wound wide open, cutting the bones and nerves short, and making sutures only as they are necessary to control bleeding. Then we apply a type of dressing which will not in any way interfere with free drainage. It is amazing how well such stumps will heal and how tough they become. One may later make a more conventional stump, but usually the patient elects to leave the stump as it is. Careful attention to the diabetes throughout the preoperative and postoperative period is, of course, necessary.

### *Summary*

The diabetic patient should be brought into a hospital for regulation of his diet and insulin dosage, and for instructions in the management of his disease. The diet should be adjusted according to the temperament and exercise requirements of the individual, as well as to his height and age.

So far as possible, the complications of diabetes should be treated prophylactically. Of these complications, arteriosclerosis is the one responsible for the highest mortality.

### *Discussion*

**Dr. G. O. Moss** (Cliffside): Dr. Crowell is to be congratulated for daring to handle a diabetic with common sense and for his practical instructions to the family physician. It is difficult for the general practitioner to carry out the methods of treating a diabetic which are born of ultra-scientific poppycock. Calorie-splitting might be desirable in a teaching institution, but with the majority of diabetics and the average physician who is responsible for their care, such exactness is most certainly impractical, or impossible. I am thoroughly convinced that both patient and practitioner get along better if traces of sugar in the urine are deliberately planned.

One of the tragedies of diabetic arteriosclerosis is gangrene of the lower extremities, and it is only on this point that my limited experience would justify an attempt to comment. I am concerned with diabetic gangrene without infection. Amputation offers nothing in the way of eliminating the cause, and therefore should positively be a last resort. None of the several texts to which I have referred mention a method of treatment which has been highly satisfactory in the few cases I have had the privilege of treating. The method to which I refer is that of applying alternate heat and cold.

Results with this method, as with other methods of treatment, are dependent largely on the stage at which the treatment is instituted. Therefore, all elderly diabetics should be instructed to watch for and report immediately any signs of beginning gangrene. I recall one patient, however, who had gross death of tissue in several toes, but who, with persistent and patient treatment for more than a month, recovered.

The hot-and-cold method of treatment requires little equipment—just two cans sufficiently large and deep to admit the foot and leg to the knee or above. A fifty-pound lard can is quite satisfactory. If the patient's economic status affords plumbing and his bank account would permit the services of a tinner, as well as a plumber, a more elaborate and efficient system can be installed.

One of the cans is filled with warm water, the other with cold. The affected leg is placed in hot water for three and one-half minutes, and then in cold water for one-half minute; this procedure is repeated four or five times at a sitting, and the treatment can be repeated every three or four hours. Between treatments the limb should be placed in a slightly dependent position, with heat applied constantly until the next hot-and-cold treatment. Since we are dealing with devitalized tissue which is easily insulted by too much heat, we should begin with temperatures which can be tolerated and increase the heat as the tissues become more tolerant.

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**The Possibility of a Double Diagnosis in Diabetes.**—A double diagnosis should always be considered in diabetes. A single diagnosis to explain all the symptoms that a patient manifests was the rule we were all taught to adopt in our early medical education. Such a rule, however, is fallacious in diabetes, and double diagnoses are now more frequent . . . It is safe to assume, when a diabetic patient is not doing well, if his diet is adjusted and if he is taking the usual dose of insulin, that another diagnosis exists; one should always look for the accompanying diagnosis.—Elliott P. Joslin: Diabetic Hazards, New England J. Med. 224:591 (April 3) 1941.

# THE PROPHYLAXIS AND MANAGEMENT OF REACTIONS TO PENICILLIN

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Although considerable research has been centered on penicillin, the complete separation of the skin-reactive or toxic factors from the therapeutic principle has not as yet been accomplished. Paralleling the studies on the clinical applications of penicillin have been investigations of ways to avoid an increasing number and variety of untoward reactions resulting from its administration. These reactions may be divided into the two broad categories of hypersensitivity and toxicity. Lyons(1) has further divided the toxic reactions into those associated with a particular batch of penicillin, thought to represent a reaction from some impurity, and those produced by the active principle itself. The former are characterized by chills, eosinophilia, headache, flushing of the face, muscle cramps, nausea, and vomiting. Reactions not associated with any particular batch of penicillin, according to Lyons, are characterized by urticaria, fever, and transient azotemia. Reported experimental and clinical evidence indicates that dermatoses are occurring in an increasing number of patients who have, or acquire, an idiosyncrasy to the active principle itself. The exact origin and mechanism of penicillin allergy remain obscure, but clinical experience has shown a number of expedients which may be used to avoid undesirable reactions.

## *Prophylaxis*

### *Choice of type of penicillin*

The choice of a proper salt of penicillin and the administration of the crystalline fractions rather than the less highly purified amorphous salts constitute one of the most effective prophylactic measures. Penicillin is an organic acid which reacts chemically to form salts and esters. Salts of the various cations such as sodium, calcium, ammonium, strontium, potassium, and barium have been synthesized(2). Of these preparations the calcium, potassium and sodium salts are available commercially. Wright and Rule(3) have shown that the number and severity of reactions vary with the salt used, especially if the salts are administered orally. They reported that toxic reactions occurred in 9 per cent of their patients who used sodium penicillin lozenges; these reactions were mild and of short duration. When the calcium salt was used, 16 per cent of the patients treated had reactions which persisted for as long as fifty-seven days. The subcutaneous or intramuscular administration of the ammonium salt is often painful(4).

Until the crystalline G fraction recently became available, the penicillin administered contained twenty or more impurities(2). Because it is devoid of many of these impurities and tissue irritants, the use of crystalline penicillin G rather than the more crude amorphous salts will eliminate many reactions. This statement is borne out by the recent experience of Barefoot and Olansky(5), who reported the case of a patient tolerating the administration of crystalline penicillin G after showing repeated severe urticarial reactions to the more crude amorphous salts.

### *Method of administration*

The method and frequency of administration, especially when repeated courses of penicillin therapy are given, may greatly influence the type and incidence of reactions encountered. Local or topical use of penicillin will give rise predominantly to contact dermatitis, while parenteral administration is more apt to produce endogenous dermatoses or toxicoses. The ease with which epidermal sensitization can be induced by repeated topical applications has been shown(6); the comparative ease with which hypersensitivity can be induced by repeated intradermal injections has also been demon-

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strated(7).

It may be postulated that the antigen contained in penicillin produces antibodies in susceptible patients. When these antibodies reach a sufficient concentration, they overflow into the circulation, where they remain for varying periods of time. When this humoral phase has passed, the antibodies may become fixed in the tissues. This fixation often results in a localized hypersensitivity, which has been shown to be greatest at the point where the penicillin antigen was introduced or at the site primarily in contact with the antigen(8). In patients who have a history of penicillin reactions and in whom further reactions of a particular type are to be avoided, the route of administration thus assumes great importance.

The ease with which penicillin hypersensitivity can be induced should serve as a warning against unnecessarily repeated courses of therapy or indiscriminate cutaneous testing. The dangerous and untoward reactions resulting from intrathecal injections of penicillin have been reported recently(9). Thrombosis resulting from prolonged intravenous administration of penicillin solutions has also been reported; this may be avoided by the use of the intramuscular route. Pulmonary embolism has followed the accidental intra-arterial injection of penicillin in oil and beeswax(10).

### *Technique of injection*

Faulty techniques of injection may be followed by disastrous results in penicillin therapy. The use of a separate syringe and separate needle for each patient will avoid the transfer of viruses and bacteria non-sensitive to penicillin from one patient to another. Cases of post-penicillin jaundice (hepatitis) may result from repeated use of the same syringe, even though the needle is changed each time, when several patients are given intramuscular injections in series. The experiments of Hughes(11) have shown "three possible mechanisms which, either separately or together, might account for this contamination. These are (1) back pressure forcing fluid from the muscle into the needle, (2) spread of blood from the tip of the needle towards the syringe, and (3) suction when removing the needle from the syringe, aspirating the needle contents back on to the tip of the latter."

### *Eradication of pre-existing fungus infections*

The relationship between previous fungus infection and reactions to penicillin has been recognized since Schnurman's report of 5 cases of latent trichophyton infection apparently reactivated by penicillin therapy(12). He attributed these reactions to a common antigen found in many of the lower fungi. Other investigators have attributed this phenomenon to cross-sensitization, or possibly to conjoint sensitivity. The most plausible explanation is that the patients become sensitized to the penicillin elaborated by other fungi *in vivo* during attacks of dermatophytosis. Whatever the explanation, the eradication of pre-existing fungus disease has been found to be one of the most important practical prophylactic measures to be undertaken in modern penicillin therapy.

### *Cutaneous testing*

The use of cutaneous testing as a means of detecting penicillin hypersensitivity prior to administration of the drug is found reliable and practical in only about 24 per cent of the cases(13). This low index of reliability is the result of the number of uncontrollable variables encountered in such reactions. If penicillin idiosyncrasies are accepted as being on an antigen-antibody basis, then the results obtained in cutaneous testing must be dependent on the rate, site, and number of antibodies formed. As any or all of these factors may apparently show wide variations, the results of cutaneous testing are unpredictable. Kolodny and Denhoff(14) have reported, moreover, that even in consistent reactors to penicillin periods of relative anergy lasting from five to seven days are encountered. In a case reported by Zeller(15), as little as 50 units of commercial penicillin

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would produce urticaria during the reactive phase, but during the anergic state increasing doses of penicillin up to 25,000 units were tolerated without reactions of hypersensitivity.

*The avoidance of therapeutic shock*

Therapeutic shock, although not a penicillin reaction *per se,* has attained such importance in the treatment of syphilis that the Jarisch-Herxheimer reaction should be emphasized. The injection of an efficient spirocheticide such as arsenic or penicillin results in the destruction of large numbers of spirochetes. Both general and local reactions have been attributed to the liberation and absorption of their proteins or endotoxins. Such reactions are reported to occur in 75 per cent of the cases of early syphilis treated with penicillin(16), and are said by Stokes(17) to occur synchronously with the hours of greatest destruction of spirochetes.

The importance of such reactions, especially in late syphilis, varies with the site. In several sets of circumstances the avoidance of such reactions may be of life-saving importance. A Herxheimer reaction may cause a fatal coronary occlusion or aneurysmal rupture(18). If there is extensive cerebral vascular or cortical involvement in neurosyphilis, the sudden edema and infiltration of the vessels may cause cerebral hemorrhage or precipitate an acute paresis. Competent syphilologists, therefore, guard against the possibility of severe febrile constitutional reactions and these unpredictable local effects by initiating treatment with small doses of penicillin, or by a thorough preparatory course of treatment with bismuth. The reactions reported by Olansky(19) following even relatively small initial doses of penicillin would indicate that the latter procedure is perhaps safer.

## *Management*

Since many reactions encountered during the course of penicillin therapy are mild, transient, of short duration, or self-limiting, it is rarely necessary to abandon such therapy altogether. A large number of these reactions may be eliminated by the simple expedient of changing brands or lot numbers of the penicillin administered. The therapist should be sure that such a change is really being made. It is common knowledge that a few of the larger drug houses supply a number of smaller companies, each of which may market the same penicillin under a different name. Thus a true change of penicillin may not be accomplished merely by changing the trade name.

*Of urticaria*

Several measures have been instituted for the control of urticaria, the most common reaction encountered in penicillin therapy. The more mild and early urticarial reactions may be terminated by the administration of flushing doses of nicotinic acid. As there is apparently a great amount of histamine released in many of the more severe reactions, the anti-histamine drugs, benadryl and pyribenzamine, are often of great value in controlling them. By the simultaneous administration of one of these drugs it is sometimes possible to continue penicillin therapy in the face of one of the so-called endogenous types of reactions. If the reaction to penicillin is severe and it is still necessary to continue penicillin therapy, Pillsbury and his coworkers(20) have recently advocated the intravenous administration of benadryl in doses of 5 to 10 mg. in 20 cc. of isotonic sodium chloride. These investigators point out, however, that the hypnotic effect is often startling.

*Of the delayed reactions*

The delayed allergic reactions, particularly the type which resembles serum sickness, are difficult to control. The intravenous use of procaine has been advocated by Rosellini and Van Rooy(21), as well as by State and Wangensteen(22), who recommended 1 Gm. of procaine in 500 cc. of normal saline. From our experiences with such therapy we are not convinced that it does not have dangerous potentialities. We have, therefore, come to rely primarily on the intravenous administration of calcium and the intramuscular

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22. State, D., and Wangensteen, O. H.: Procaine Intravenously in Treatment of Delayed Serum Sickness, J.A.M.A. 130: 990-995 (April 13) 1946.

administration of adrenalin in oil for the control of these more severe reactions. Although these patients are extremely uncomfortable, such reactions are usually self-limiting in a matter of days, and the more heroic measures afforded by other types of intravenous medications are unjustified.

### *The anergic period*

Advantage may be taken of the anergic period for therapeutic action(23). Although this period usually lasts from five to seven days and will permit the administration of a considerable amount of penicillin, its duration is unpredictable and uncontrollable. Under such circumstances penicillin should be administered with careful supervision, and the patient's degree of reactivity to this antibiotic should be followed, so far as possible, by cutaneous testing at regular intervals.

### *Desensitization*

Successful desensitization, which eventually permitted the administration of penicillin to an extremely hypersensitive patient, has recently been reported by Peck and his associates(24). The technique described consists in the subcutaneous injection of penicillin three times a week in gradually increasing doses. The first injection, in the case reported, contained 400 units of non-crystalline penicillin. Each subsequent dose was doubled so that 12,800 units were injected at the end of the second week.

The use of penicillin is usually urgent and imperative. In our experience we have found numerous patients who react to as little as 2.5 units of penicillin. To desensitize them sufficiently to tolerate effective therapeutic dosages may require months, and is therefore impractical except in cases of "elective" penicillin therapy. The degree of penicillin sensitivity shows wide daily or weekly variations from complete anergy to severe reactions to as little as 50 units(15). This fact makes the interpretation of the results of desensitization difficult and impractical in therapy.

### *Conclusions*

1. The complete separation of skin-reactive and toxic factors from the therapeutic principles in penicillin has not been accomplished.

2. Reactions to penicillin may be influenced by the salt used, the initial dosage, and the route and technique of administration.

3. The eradication of pre-existing fungus infections is important in the prophylaxis of reactions to penicillin.

4. Penicillin reactions are probably on an antigen-antibody basis. Cutaneous tests are of limited value as a guide to therapy. The anergic phase in penicillin sensitivity is unpredictable and uncontrollable. Its use for therapy should be carefully supervised.

5. The use of benadryl and other anti-histamine drugs is preferable to the more dangerous intraveneus administration of procaine solution in the treatment of allergic reactions to penicillin.

6. Desensitization to penicillin is impractical except in the less urgent cases.

23. Farrington, J., Dickerman, F., and McGowan, W.: Observations on Variations in Reactivity in a Case of Allergy to Penicillin, Ann. Allergy, in press.
24. Peck, S. M., Siegal, S., and Bergamini, R.: Successful Desensitization in Penicillin Sensitivity, J.A.M.A. 134:1546 (Aug. 30) 1947.

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## INSULIN AS AN ADJUNCT IN THE TREATMENT OF ANXIETY STATES

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The use of insulin in sub-shock doses in the treatment of acute anxiety states is being rapidly popularized as various publications dealing with this technique in the treatment of war neuroses appear in the literature. Insulin, of course, has been employed in psychiatry for many years, but not until 1940 did a report appear dealing with the use of mild hypoglycemic shocks in the treatment of mental disease. This report by Polatin, Spotnitz and Wiesel(1) heralded the use of insulin in doses sufficient to produce hypoglycemia but not large enough to cause insulin shock or coma. These authors utilized their technique primarily in psychoses, although 2 patients with psychoneuroses were included in their original study, both of whom improved to some degree.

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Read before the Section on Neurology and Psychiatry, Medical Society of the State of North Carolina, Virginia Beach, May 14, 1947.

1. Polatin, P., Spotnitz, H. and Wiesel, B.: Ambulatory Insulin Treatment of Mental Disorders, New York State J. Med. 40:843-848 (June 1) 1940.

### *Use in the Treatment of War Neuroses*

Debenham, Hill, Sargant, and Slater[(2)] were the first to report the use of insulin directed exclusively at the treatment of neurotic states. These authors, who were responsible for treating many of the survivors of the Dunkirk disaster, mentioned briefly that in addition to sleep therapy "a modified form of insulin treatment is useful in some cases for breaking down the vicious cycle of anxiety and loss of weight." Sargant, who was primarily responsible for the introduction of this type of therapy, later presented, with Craske[(3)], a discussion of the use of modified insulin therapy in war neuroses.

He began by using light-coma doses, but later discovered that his results were equally as good if coma did not develop. These techniques were developed in the stress of the London blitzes and were specifically directed at breaking up the vicious cycles developing in the acute traumatic neuroses of war. Twenty to 100 units of ordinary insulin was given to the fasting patient at 7 a.m. The dose of insulin was supposed to be "just insufficient to produce a light coma or hypoglycaemic excitement. The interruption at 10 a.m. is by giving a cup of tea containing 2 oz. of sugar, the rest of the carbohydrate being made up with 12 oz. or more of potatoes." The substitution of potatoes for sugar may appear startling, but was the result of the British sugar shortage. Actually, the substitution was of value, since it led Sargant to note the tremendous quantities which were consumed and suggested the large feeding routine, which is one of the bases of the technique.

The aim of their treatment was to produce a state of drowsiness for as long as possible between injection and interruption. "If the patient shows signs of slipping into light coma, he is at once aroused by a cup of sweet tea and thereby brought round sufficiently to eat the potatoes. The dose of insulin is then reduced slightly the next day." A full lunch was provided at 12:15, and in the afternoon the patients were given a physical training period. In spite of the exercise, no delayed reactions were experienced. Sargant adds that "this method is almost entirely without danger and by it as many as 20 patients can be treated in a ward simultaneously if desired."

When we talked with Sargant about this method early in 1942, he felt that an entire ward of insulin cases could be set up. At that time, however, the director of his hospital felt that the method was "too new and revolutionary and might prove dangerous," so that Sargant was only allowed to treat a small number of cases in any one day. It was our great pleasure late in 1943 to introduce Sargant to our modifications of his techniques and demonstrate a series of wards, each containing thirty beds, where we were treating simultaneously some 300 patients by his methods every day. We have presented these original findings at some length since the basic routines have only been slightly modified and enlarged, and Sargant's fundamental concepts have been completely vindicated by the hundreds of cases which were treated in the European theater.

Our experience with this technique in military psychiatry began at the Thirtieth General Hospital in December, 1942, and continued until V-E day in 1945. During this interval, we personally saw more than 15,000 patients, each of whom was given from seven to thirty treatments. These treatments were administered in the neuroses hospitals of the European theater, both in England and in Belgium, where approximately 50 new patients were admitted every twenty-four hours. Most of these patients were put on insulin therapy, and in Belgium, for example, we frequently were treating 400 to 500 individuals with insulin therapy daily. With such a vast amount of material we soon found routine patterns of therapy, and it was our custom to allow subordinate medical officers to handle the usual cases. All those who showed unusual reactions were placed on a ninety-bed ward, where one of us spent a major portion of his time each morning observing special reaction patterns.

### *Indications*

It quickly became obvious that patients suffering from acute war neuroses who had previously demonstrated a good stable personality responded much better to this therapy than did the chronic neurotic individual. The results of our treatment lend weight to

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2. Debenham, G. R., Hill, D., Sargant, W., and Slater, E.: Treatment of War Neuroses, Lancet 1:107-109 (Jan. 25) 1941.
3. Sargant, W. and Craske, N.: Modified Insulin in War Neuroses, Lancet 2:212-214 (Aug. 23) 1941.

Kardiner's classification of the traumatic neuroses, and it is our feeling that his concept of the physioneurosis is most important, since individuals falling into this classification are those in whom insulin therapy produces its best effects. This type of therapy is of value in individuals who are suffering from acute reactive disorders—those which have a fairly sudden onset and almost invariably are accompanied by marked psychosomatic symptoms, particularly weight loss. Chronic psychoneurotic patterns, especially those stemming from fundamental constitutional inadequacy, do not respond nearly as well, and depressions are helped only if they are truly reactive in nature. A gain in weight, however, occurs in almost every instance. It was found that, while our most important results occurred in the traumatic neurotic group, many other types of psychiatric syndromes, particularly gastrointestinal reactions and even the chronic neuroses, were helped to some degree by the physiologic improvement resulting from the therapy.

### *Mode of Action*

We have, of course, no real idea as to the way insulin works in the anxiety state, but we know that it accomplishes certain definite physiologic results. Sargant and Slater, in their book, *Physical Methods of Treatment in Psychiatry*(4), compare their technique to the work of Weir Mitchell, who secluded his patients and then increased their diet to a point nowadays never reached. Sargant has unearthed the fact that Weir Mitchell developed his ideas following his treatment of acute combat neuroses occurring in the Civil War. The gain in weight resulting from the insulin treatment, aside from its physiologic value, is certainly impressive to the average patient. He feels that he is getting better because for countless generations the idea has permeated our civilization that plumpness is a sign of health and that loss of weight indicates sickness. Consequently, many of our patients would make the statement: "Doc, I feel lots better. Look how much weight I have gained." It is obvious, of course, that the restoration of the body to normal weight level is advantageous physiologically, but we must never lose sight of the fact that this fattening is a potent psychologic factor in improvement, just as the routine of treatment is a powerful suggestion.

### *Routine of Treatment*

Our routines in the European theater were essentially designed as part of a total-push method of therapy. The patient received his insulin in the morning, and in the afternoon was carried through a strenuous program of physical therapy, occupational therapy, recreational therapy, and individual and group psychotherapy which terminated only at bedtime. For civilian use, our routines have been essentially the same, the afternoon program, of course, being dependent upon the facilities available. The one thing that should be stressed, however, is that these patients are ambulatory and should not remain in bed after the daily treatment has been terminated. Strenuous exercise in the afternoon occasionally may precipitate a feeling of weakness or giddiness if the morning dose of insulin has been large. We encountered no cases of collapse, however, in our 15,000 patients, and the few instances of transitory mild hypoglycemia were quickly alleviated by the ingestion of sugar in the form of simple syrup, which the patient's attendants carried at all times.

Patients are selected for therapy on a basis of their past history and present symptoms. The usual initial dose of insulin is 40 units given at 7 a.m. after a night's fast. Hypoglycemic symptoms rarely appear with this dose, but if for any reason the physician is afraid of his patient's reaction, he can begin with 10 units. We found that 40 units gave us a better start, diminished the total length of time required to achieve pre-coma dosage, and only in rare cases produced early coma. We had always heard that some people are sensitive to insulin, and occasionally recommended that small test doses be given prior to treatment. None of our patients ever showed such an idiosyncrasy, however, and it seems very doubtful if such sensitivities exist in patients with normal carbohydrate metabolisms.

The insulin dose is increased by 10 to 20 units daily until symptoms of hypoglycemia appear. The optimal dosage is indicated by marked hunger, diaphoresis, anxiety, and a general sense of weakness. Following Sargant's idea, we wanted the patient to become sufficiently hypoglycemic to demonstrate a

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4. Sargant, W. and Slater, E.: Introduction to the Physical Methods of Treatment in Psychiatry, Edinburgh, E. & S. Livingstone, 1944.

marked reaction, but still to retain sufficient consciousness to ingest his food without assistance. Ordinarily 70 to 100 units of intramuscular insulin was all that was required. Occasionally a patient will fail to react at all; we have seen several hundred units of insulin fail to produce apparent hypoglycemia. On the other hand, occasional patients will develop definite symptoms with 40 units or less. We have had 2 patients who required only 10 units for their entire course of treatment; such cases are extremely rare, however. If at any time the patient lapses into coma or develops motor excitement, the treatment is terminated for that day and subsequent doses are decreased by 10 units. If the treatment is not terminated prematurely, the patient is usually allowed three or four hours of hypoglycemia, and fed at 10 or 11 o'clock.

Our study indicates that the best type of feeding is a mixture of breakfast and lunch, appropriately termed "brunch." It consists of a large bowl of hot cereal heavily sugared, together with the regular lunch of the day. Too often the patient is fed a cold and unappetizing breakfast tray at 11 o'clock, and then at 12 is expected to eat a hot lunch. It is essential to set up a specific feeding routine if the treatment is to be successful. This will mean constant conflict with the hospital dietitian unless the treatment is made to fit into the usual hospital feeding routine. The British dietary habits are ideal for the insulin treatment; they seem to be constantly eating, and in any hospital it was very easy to secure a meal for the patient at nearly any time of the day or night. This was definitely not true in our army, and is equally untrue in civilian hospitals.

The routine which we have found to be most useful employs an early large feeding between 10 and 11. Ordinarily, hospital diet kitchens are ready to serve lunch about this time, and the feeding can be regulated to suit the dietitian's convenience by simply moving the time of insulin injection forward or backward so that about three hours intervene between the injection and feeding. It is easy enough to have a bowl of hot cereal added to the regular lunch, and the only other special feature of the meal is that all portions should be increased and a high vitamin intake emphasized. The average patient can easily be aroused and will sit up in bed and eagerly devour his food. After lunch a short rest period can be given, following which the patient should be made to take some mild exercise. Extra nourishment is given around 3 o'clock. Supper is served at the usual hour, somewhere between 5 and 6 in the afternoon, and sandwiches and milk drinks are given just before bedtime. With this routine, the hospital has to supply only two regular meals, lunch and supper, and in addition one extra bowl of hot cereal per patient in the morning and sufficient supplies for sandwiches and liquid nourishments in the afternoon and late evening. Such a routine puts no extra stress on the diet kitchen, and at the same time insures adequate quantities of food, spaced so that the patient will get all he wants to eat but will not lose his appetite by being forced to eat too frequently.

*Management of complications*

With this routine of treatment, the danger of complications is practically nil. The only untoward reactions which can occur are: (1) that the patient may lapse into a comatose state and (2) that spontaneous convulsions may develop. The first reaction is of no significance. A nurse or attendant circulating throughout the ward can easily spot any patient who is becoming too drowsy and can terminate the treatment by the oral administration of dextrose or glucose solutions. The English used sweetened tea. Sweetened fruit juice can be used, or a mixture palatable but economical can be made of ordinary syrup and lemon crystals. If too much fluid is given, however, the patient may lose his appetite for the day's feedings. In a large series of cases, nearly 200, we found it expedient to substitute 2 ounces of slightly diluted whiskey for the sweetened fruit juice —a method of termination which is extremely agreeable to most patients and which leaves them eagerly anticipating the coming meal.

Another simple expedient in cases where the individual is too drowsy to swallow or has reached a very early stage of stupor is to give ½ to 1 cc. of adrenalin solution, 1:1,000, intramuscularly. This will rouse the patient in a period of three or four minutes, so that he can take glucose solutions by mouth. If coma has actually developed, glucose may be administered by means of a nasal tube, but the easiest way is simply to give a 50 per cent solution of glucose intravenously. Twenty-five cubic centimeters is all that is necessary, and in a very few seconds the patient will be sufficiently roused to take his feeding without assistance. From experience with the insulin treatment of schizophrenia, it is common knowledge that a brief transitory period of hypoglycemic coma is not dangerous, and consequently termination of this beginning phase of coma need not be hurried. Since usually only 1 or 2 patients out of every 30 will require early termination of the hypoglycemic state, intravenous glucose will only occasionally have to be employed. Not infrequently, as the hypoglycemia reaches the deeper levels, patients become excited rather than stuporous. Such motor excitement is terminated by any of the above methods.

The other complication, spontaneous convulsions, is rare. In our experience, a convulsion usually occurs about once in every 500 treatments. Such convulsions, however, frequently result from very small doses of insulin—as low as 40 to 50 units—and consequently are completely unpredictable. If convulsions do occur, treatment should be immediately terminated by the use of intravenous glucose, and the subsequent dosage of insulin should be cut drastically. After some experience with these reactions, it was discovered that the routine administration of 1½ grains of phenobarbital half an hour before the injection of insulin prevents their occurrence. After the introduction of this type of therapy, nearly 3000 treatments were given without the appearance of any convulsive complications. Then the hospital, which was situated rather far forward, ran out of phenobarbital. In the next week convulsions occurred at the expected rate of about 1 per 500 treatments. As soon as more phenobarbital was available, the convulsions ceased. There is no doubt but that this small dose of phenobarbital is completely adequate to prevent the occurrence of convulsions in these cases. A great many patients will demonstrate motor twitchings and clonic movements of various muscle groups, but these must not be interpreted as dangerous.

### *Results*

Weight gain is usually noted about the third or fourth day of treatment, and is usually proportionate to the amount of weight originally lost. Another result which is noticeable early is the sedative action of insulin. This was commented upon by Sargant and was verified in our cases. Insulin has a definite sedative action which it exerts not only during the period of hypoglycemia, but for the rest of the day. Symptoms of acute anxiety, tremor, perspiration, restlessness, and insomnia will tend to improve toward the end of the first week.

We experimented with periods of treatment ranging from three days to two months, and found that some benefit is usually noticed in about seven days. The optimum period of treatment is approximately twenty-one days; this varies for each case, however, and treatment should be continued as long as improvement is manifested.

Finally, it must be emphasized that, while insulin exerts a profound physiologic action which seems beneficial in the acute anxiety states, it will not change an individual's psychologic pattern and consequently will not alleviate a specific psychologic situation. This fact was amply demonstrated by a comparison of the results obtained in hospitals where total-push psychotherapeutic measures were used and in other hospitals in the European theater where insulin alone was given without psychotherapy. Results from a physical point of view were parallel, but from a final psychiatric point of view results were almost nil if insulin alone was employed. It is easy for the psychiatrist – and even more for the general practitioner – to seize upon insulin as a method of cure for the anxiety state, hoping thereby to cut short the period of therapy and substitute chemical for psychologic attack. This belief can only serve to discredit the method. Insulin at best is an adjuvant, to be used only by someone who can also employ other methods of psychotherapy.

### *Summary*

Insulin acts physiologically in the anxiety states to combat the autonomic imbalance of anxiety. Hohman and Kline(5) have postulated that "the production of hypoglycemia by sub-shock doses of insulin stimulates the sympathetico-adrenal mechanism at the hypothalamic level, thus restoring autonomic balance, reestablishing homeostasis and probably influencing the cortex via the hypo-

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5. Hohman, L. B., and Kline, C. L.: Sub-shock Insulin Therapy in Anxiety States and Anxiety Depressions, Dis. Nerv. Syst. 7:293-298 (Oct.) 1946.

thalamus. Signs of parasympathetic excitation are also present." Whether this hypothesis is true or not remains to be seen. There is no doubt, however, that insulin does act to ameliorate the physiologic features of anxiety. Secondly, insulin acts as a profound suggestive method, in that the patient feels that something is being done—something that obviously produces results since it makes him want to eat. The patient also is influenced favorably by the marked weight gain. These results—the alleviation of the physiologic symptoms of anxiety, and the suggestive features—make the patient more amenable to psychotherapy. They do not replace psychotherapy; they only bring the patient to a point where he can be adequately treated by the psychiatrist concerned with his case.

### *Discussion*

**Dr. R. Burke Suitt (Durham):** I think we are particularly fortunate in having a paper of this scope and quality to initiate the assembly of this section. I would like to ask Dr. Kelley to comment further about the nature of three symptoms in anxiety and the closely related conditions in which this method of treatment is used. The first pertains to those symptoms of the acute anxiety attack as a crisis or as an episode; the second is the effect of depression that complicates states characterized by anxiety in some patients; and the third is the nature of the biologic concomitants of depression, beyond weight loss and gain, in relation to this treatment.

**Dr. Leslie B. Hohman (Durham):** Sargant made the point in his original paper that the motivation of the individual had much to do with his response to insulin therapy. I have had three experiences with this method of treatment. In the first group of cases, treated in navy hospitals during the war, the results were disappointing. The patients gained weight, but there was not much alleviation of either anxiety or depression. We did have a few startling recoveries, however. After the war I tried it again in a navy hospital. This time it worked miraculously, and practically every patient that we treated got well. Unfortunately, these patients could not be followed long enough to see what the late results would be. My third experience with insulin therapy was in veterans who had the same type of anxiety with depression, but more chronic. There the results were again disappointing; they would get much better for a month, then slip back again.

**Dr. Thompson:** We have continued to use insulin subshock therapy in civilian practice to a certain extent since we've been in Winston-Salem. I would say that we are getting worthwhile results in the combined anxiety and depressive states seen so often. I have used it with excellent effect in 1 patient with hyperemesis gravidarum—a woman in about the second or third month of pregnancy who had developed such severe nausea and vomiting that the obstetricians threw up their hands and thought they were going to have to interrupt the pregnancy. With a few insulin treatments she was soon on the road to recovery. I mention that case as suggesting a possible added use of the method.

**Dr. Kelley:** Answering Dr. Suitt's questions, I would like to begin with the physical concomitants of anxiety, such as perspiration. These all appeared in soldiers within periods of time ranging from an hour and a half to eight months after the men had come out of combat. We found that the longer the duration of the anxiety, the less effect insulin had; the sooner this treatment was instigated, the better the results. The depressions, as far as we can find, are not helped too much; the psychoneurotic symptoms, to some degree, are.

I agree with Dr. Hohman that insulin worked better in combat than it does on veterans or civilian patients. I think that this method of insulin treatment is most useful in cases of acute anxiety. In patients who have had a long time to fix the anxiety, insulin is an adjuvant method of therapy which simply puts the person in good physiologic shape. I want to stress the point that it must be used **in conjunction** with other methods of therapy.

# FRIEDLÆNDER PNEUMONIA WITH BACTEREMIA SUCCESSFULLY TREATED WITH STREPTOMYCIN

## *Report of a Case*

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Until recently the treatment of pneumonia due to the Friedländer bacillus (Klebsiella pneumoniae) was unsatisfactory, the reported mortality rate ranging between 71 and 97 per cent(1). Soon after streptomycin was first described in 1944 by Schatz, Bugie and Waksman(2), Heilman and his coworkers at the Mayo Clinic showed by *in vitro* tests that nine different strains of the Friedländer group can be inhibited by this antibiotic(3). They found that 90 per cent of 69 mice inoculated intra-abdominally with this organism and treated with streptomycin survived, while all of 44 untreated controls died. Within the same year Herrell and Nichols(4) reported the first clinical use of streptomycin against disease caused by the Friedländer organism—2 cases of chronic pulmo-

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1. Perlman, E. and Bullowa, J. G. M.: Primary Bacillus Friedlænder (Klebsiella Pneumoniae) Pneumonia: Therapy of B Friendlænder B Pneumonia. Arch. Int. Med. 67:907-920 (May) 1941.
2. Schatz, A., Bugie, E., and Waksman, S. A.: Streptomycin, Substance Exhibiting Antibiotic Activity Against Gram-Positive and Gram-Negative Bacteria. Proc. Soc. Exper Biol. and Med. 55:66-69 (Jan.) 1944.
3. Heilman, F. R.: Streptomycin in Treatment of Experimental Infections with Micro-Organisms of Friedlænder Group (Klebsiella). Proc. Staff Meet., Mayo Clin. 20:33-39 (Feb. 7) 1945.
4. Herrell, W. E., and Nichols, D. R.: Clinical Use of Streptomycin: Study of 15 Cases. Proc. Staff Meet., Mayo Clin., 20:449-462 (Nov. 28) 1945.

nary suppuration. During 1946, 2 cases of acute Friedländer pneumonia treated with streptomycin were reported(5).

Until October 9, 1947, 4 cases of Friedländer pneumonia complicated by bacteremia and successfully treated with streptomycin had been reported to the National Research Council(6). Another case of this type is reported below.

### *Case Report*

The patient, a 16-year-old white schoolboy, was well until March 7, 1947, when he developed malaise, headache, anorexia, fever, and cough productive of brownish sputum. Within the next few hours he experienced knife-like pain, aggravated by coughing, in the right anterior portion of the chest. On the following day a chill occurred, followed by vomiting and fever of 104 F. Examination on that date revealed a pleural friction rub and diminished breath sounds beneath the right axilla. Sulfadiazine in doses of 1 Gm. every four hours was started.

When admitted to the hospital on March 11, the patient was seen to be acutely ill, toxemic, and stuporous. Breathing was rapid and shallow, and the patient was complaining of pain in the right side of his chest. The pharynx was diffusely injected, and herpes labialis was present. The heart rate was rapid, but no murmurs were heard. The blood pressure was 120 systolic, 80 diastolic. Examination of the chest revealed dullness to percussion, diminished breath sounds and increased tactile fremitus over the right lower lobe, and a loud pleural friction rub in the right axillary region. Inspiratory rales, both crepitant and moist, were heard over the entire anterior portion of the right lung.

Laboratory studies after admission revealed a leukocyte count of 17,550, with 88 per cent neutrophils (40 per cent non-segmented and 48 per cent segmented), 6 per cent lymphocytes, and 6 per cent monocytes. The hemoglobin was reported as 15.1 Gm. and the erythrocyte count as 4,900,000. Culture of the sputum produced K. pneumoniae, diphtheroids, and Candida. Blood culture was positive for K. pneumoniae. Nonprotein nitrogen, sugar, carbon dioxide combining power, and chloride determinations on the blood gave normal results. The sulfadiazine blood level was 5 mg. per 100 cc. Urinalysis showed a specific gravity of 1.034, an acid reaction, a two-plus reaction for albumin, and a trace of sugar. Microscopic examination was negative except for a few sulfadiazine crystals.

X-ray examination of the chest on admission showed evidence of a small pleural effusion on the right and heavy mottling in the right lower lobe.

Immediately after admission intramuscular injections of penicillin sodium, 40,000 Oxford units at three-hour intervals, were begun, and sulfadiazine was continued in oral doses of 1 Gm. every four hours. On March 13, as soon as the initial blood culture was reported positive for K. pneumoniae, penicillin and sulfadiazine were discontinued, and streptomycin was begun in doses of 400 mg. administered intramuscularly at three-hour intervals. In addition, oxygen, parenteral fluids, and symptomatic therapy were given.

On March 13 the patient appeared cyanotic and more acutely ill than at any time previously. On the following day, after twenty-four hours of streptomycin therapy, he appeared slightly less toxemic. The temperature (fig. 1) was spiking in type, ranging between 99 and 103 F., with a daily afternoon rise. Penicillin therapy was resumed on March 15 because of the appearance of B hemolytic streptococci in the sputum. An x-ray of the chest made on March 20 showed a ground-glass appearance of the lower two thirds of the right lung. Blood cultures made on March 13, 16, 17, 18 and 21 continued to show on each date a pure culture of K. pneumoniae; cultures made after March 21 were negative. By March 18 the leukocyte count had approached normal.

On March 21 an erythematous maculopapular eruption appeared on the face and neck and rapidly became generalized over the trunk; the superficial lymphatic glands were found to be enlarged. The patient was nauseated and restless, and appeared toxemic; his temperature was 102 F. No aural or vestibular symptoms could be elicited.

Streptomycin and penicillin therapy were discontinued immediately, and at the end of twenty-four hours the eruption had disappeared, except for an area in each axilla

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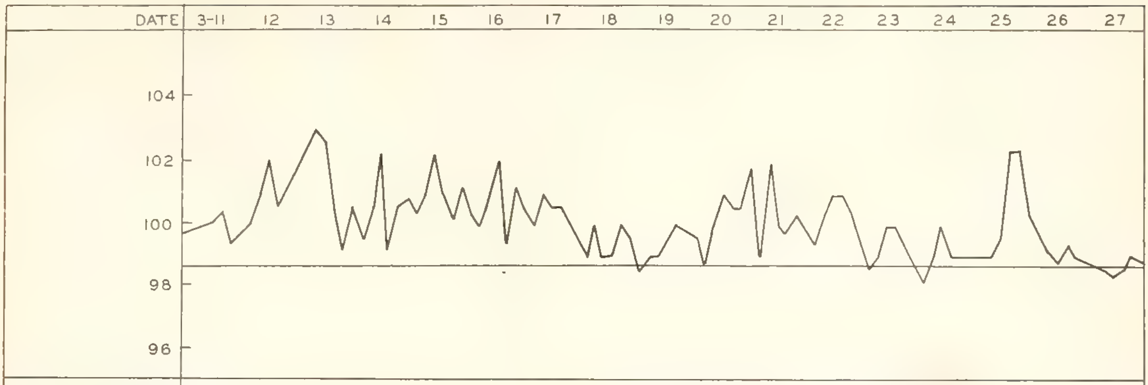
5. (a) Bishop, C. A., and Rasmussen, Ruth F.: Klebsiella Pneumonia Treated with Streptomycin. J.A.M.A. 131: 821-822 (July 6) 1946.
   (b) Learner, N. and Minnich, W. R.: Friedländer Pneumonia Treated with Streptomycin: Report of a Case with Prompt Recovery. Ann. Int. Med. 25:516-520 (Sept.) 1946.
6. Personal communication, Chester S. Keefer, Chairman, Committee on Chemotherapy, National Research Council.



| DATE | 3-11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREPTOMYCIN, GM |  |  | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |  |  |  |  | 1 |  |  |
| PENICILLIN, 000 U | 80 | 320 |  |  | 80 | 320 | 320 | 320 | 320 | 320 | 280 |  |  |  |  |  |  |
| SULFADIAZINE, GM. | 3 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| BLOOD CULTURE | + |  | + |  |  | + | + | + | − | − | + | − |  | − | − |  |  |

**Fig. 1. Temperature chart**

which persisted for several days. Patch tests using streptomycin produced a 5-mm. area of erythema after twenty-four hours; patch tests with penicillin and barbiturates (administered for insomnia) gave negative results. An intradermal test using 4 mg. of streptomycin in 0.1 cc. of saline produced a wheal with a 5-cm. area of erythema after twenty minutes; a 0.5-cm. area of erythema persisted after twenty-four hours. On March 25, 500 mg. of streptomycin was administered intramuscularly, and was followed two hours later by suffusion of the conjunctivae, a rise in temperature to 102.4 F., and the return of an eruption similar to that of March 21. Streptomycin was again discontinued, and the eruption soon faded and the temperature subsided. A tourniquet test performed on March 29 was negative, and a platelet count on that date was 231,000. The prothrombin time was recorded as 25.6 seconds (against a control of 26 seconds).

After March 26 the patient's temperature subsided, and recovery and convalescence were uneventful. He was discharged from the hospital on April 5. An x-ray of the chest made ten days after discharge showed no abnormality other than a mild pleural thickening over the right lower lobe. He has remained well since.

### *Discussion*

Bacteremia due to K. pneumoniae (Friedländer's bacillus) can be successfully treated with streptomycin. The bacteremia in this case was apparently secondary to pneumonia. It is not known whether the pneumonia was a primary Friedländer pneumonia or an atypical (virus) pneumonia which became secondarily infected with the Friedländer organism; the x-rays of the lungs were more suggestive of the latter type. The exact susceptibility of the strain of Klebsiella to streptomycin is unknown, but most strains are known to respond initially to the drug. An uneradicated source for reinfection of the blood stream, such as may occur in a chronic urinary infection with bladder paralysis or other complications, leads frequently to the rapid development of drug-fast strains of organisms(7).

Toxic manifestations did not affect the therapeutic efficacy of streptomycin. The toxic manifestations of fever, chill, malaise, and rash might readily be confused with symptoms of recrudescence of the infection due to an organism which has developed drug-fastness. The disappearance of the symptoms following withdrawal of the drug and their subsequent reproduction by the administration of a small test dose of streptomycin proved that the symptoms were due to the antibiotic; the skin test confirmed this impression.

### *Summary*

Streptomycin therapy was successful in the case of a patient with Friedländer pneumonia complicated with bacteremia. Toxic manifestations resulting from the administration of streptomycin did not decrease the efficacy of therapy.

7. Aikawa, J. K., Gillikin, C. M., Herndon, E. G., and Harrell, G. T.: Simple Laboratory Aids for the Control of Streptomycin Therapy in General Practice, South. Med. J. 40: 141-153 (Feb.) 1947.

# LOEFFLER'S SYNDROME

## *Review of the English Literature and Report of a Case*

Elias S. Faison, M.D.

Charlotte

Increasing attention has been paid in recent years to transitory pulmonary infiltration with eosinophilia, a condition which is referred to as Loeffler's syndrome. We have recently observed a patient with symptoms and signs characteristic of this disease. The pulmonary changes revealed by x-ray examination pointed toward the presence of atelectatic foci. These, in our opinion, constitute the most reasonable explanation for the transitory nature of the pulmonary lesions.

### *Case Report*

A 46-year-old white housewife was admitted to the Mercy Hospital on March 15, 1945, complaining of general malaise, chills, and fever. The family and marital histories were non-contributory. As a child she had had the usual childhood diseases. At the age of 16 she was kept in bed for two weeks by an attack of measles, and she stated that it was fully six weeks before she recovered completely. An appendectomy was performed in 1938, and in 1942 several polyps were removed from the left nostril. The patient stated that in the past two years she had had more colds than previously; her family physician told her that they were due to hay fever.

The present illness began in October, 1944, when she had repeated upper respiratory infections which she described as a "watery discharge from the nose." No cough was connected with the attacks. Her family physician treated her with cold vaccine, which he administered hypodermically about twice a week. Gradually she became more languid. Anorexia developed and she suffered from insomnia because of the respiratory difficulty.

On February 6, without apparent provocation, she had a chill followed by high temperature. She was given one of the sulfonamide drugs without improvement, and was confined to bed at home for thirty-seven days before her admission to the hospital.

Examination revealed a somewhat pale, malnourished patient in no apparent respiratory distress The pharynx was slightly hyperplastic and presented a mucopurulent exudate. No lymph nodes were palpable. The temperature was 101 F., pulse 86, respiration 20. The blood pressure was 110 systolic, 70 diastolic. The excursion of the thorax was apparently normal, and tactile fremitus was not increased. A few moist rales were heard throughout both lungs, but except for slight dullness to percussion over the right base there was nothing to suggest any consolidation. No other physical signs of consolidation developed throughout the entire course of her illness. Even though x-ray examination (fig. 1) suggested areas of consolidation, physical examination failed to confirm this impression. The spleen could not be palpated.

Sulfathiazole was begun six days after admission to the hospital and was continued for two days. The patient was also given 420,000 units of penicillin, but both drugs were without benefit. On several occasions the sputum and stool were examined for ova, parasites, and cysts. The sputum was cultured for fungi, and the first culture showed a moderate growth of the Friedlænder bacillus. Two successive cultures showed hemolytic streptococcus, Streptococcus viridans, Staphylococcus albus, and Friedlænder's bacillus. Several specimens of the sputum examined for tubercle bacilli failed to reveal the organism. The patch test for tuberculosis was negative, and serum agglutination tests were negative. The Wassermann test was negative, the nonprotein nitrogen 44 mg. per 100 cc. of blood.

Thirty-two days after the patient entered the hospital we realized that we were dealing with a case of Loeffler's syndrome. Since this is believed to be an allergic phenomenon, an autogenous vaccine combining the Str. hemolyticus, Str. viridans and the Staph. albus was prepared. The Friedlænder bacillus vaccine was prepared separately. Intradermal injections of both vaccines produced large, red, elevated wheals. It was then decided to combine the vaccines and give increasing doses every third day. Dr. William Summerville supervised this procedure. The dose was begun at 0.05 cc. on April 26 and was increased by .05 cc. every third day until 1 cc. was reached. The vaccine was then doubled in strength and the same

**Table 1**

| *Date* | *Hgb.* | *R.B.C.* | *W.B.C.* | *Neutrophils* | *Eosinophils* | *Basophils* | *Lymphocytes* | *Monocytes* | |
|---|---|---|---|---|---|---|---|---|---|
| 3-15-45 | 60% | 3,260,000 | 13,300 | 51 | 33 | | 11 | 5 | 1 unidentified cell |
| 3-30-45 | 60% | 3,870,000 | 14,200 | 50 | 33 | | 15 | 2 | |
| 4- 9-45 | | | 20,350 | | | | | | |
| 4-16-45 | 60% | 3,730,000 | 16,200 | 46 | 33 | | 17 | 4 | |
| 4-20-45 | 60% | 3,730,000 | 15,600 | 42 | 38 | 1 | 19 | | Platelet count—630,000 |
| 4-24-45 | | | | 49 | 34 | 1 | 12 | 4 | Reticulocytes—7% |
| 5- 2-45 | 65% | 3,840,000 | 10,400 | 57 | 20 | | 20 | 1 | |
| 5- 7-45 | 70% | 4,170,000 | 12,500 | 50 | 27 | | 19 | 3 | |
| 5-12-45 | 75% | 3,950,000 | 15,800 | 37 | 38 | | 23 | 2 | |
| 5-17-45 | 70% | 3,980,000 | 20,400 | 37 | 39 | | 22 | 2 | |
| 5-25-45 | 70% | 4,100,000 | 15,200 | 27 | 44 | | 27 | 2 | |
| 6-13-45 | 70% | 3,600,000 | 7,700 | 39 | 22 | 1 | 34 | 4 | |
| 6-27-45 | 70% | 4,830,000 | 9,300 | 39 | 20 | 1 | 36 | | |
| 7-11-45 | 70% | 4,240,000 | 11,000 | 55 | 15 | 1 | 24 | 5 | |
| 9-12-45 | 80% | 4,550,000 | 8,900 | 42 | 20 | | 36 | 2 | |
| 10-26-45 | 90% | 4,500,000 | 13,000 | 58 | 23 | | 14 | 5 | |
| 11-13-45 | 85% | 4,500,000 | 13,200 | 48 | 22 | | 29 | 1 | |
| 1-16-46 | 75% | 4,500,000 | 13,000 | 57 | 17 | | 24 | 2 | |
| 2-12-46 | 70% | 4,050,000 | 12,800 | 61 | 17 | 1 | 17 | 4 | |

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Read before the Section on the Practice of Medicine, Medical Society of the State of North Carolina, Virginia Beach, Virginia, May 14, 1947.

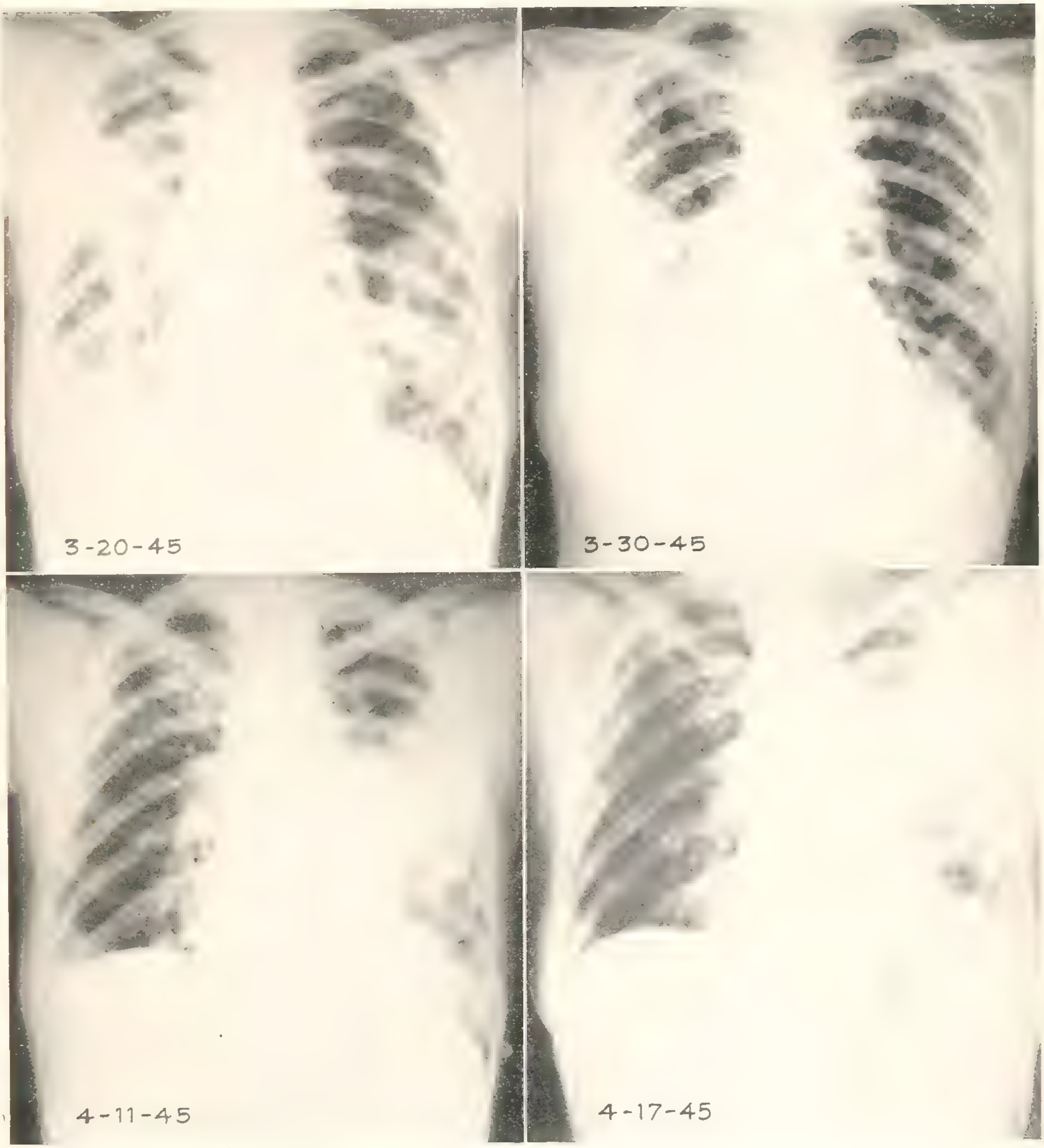

Fig. 1. Serial chest films made before the autogenous vaccine was begun. Note the shifting areas of infiltration.

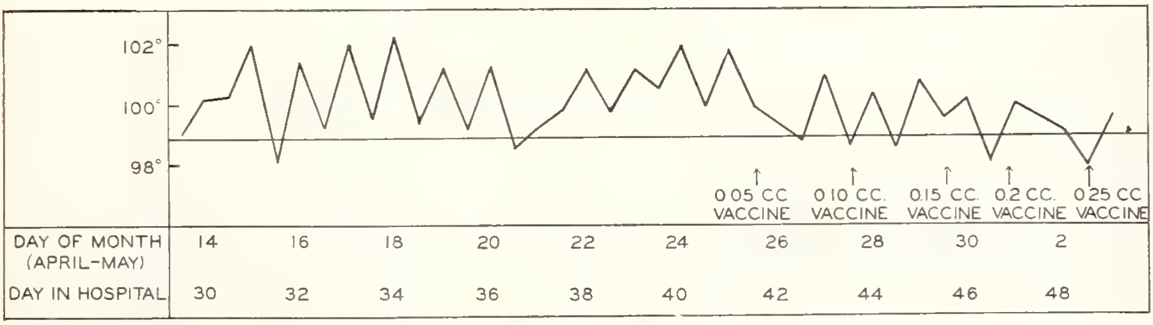

Fig. 2. Twenty-day temperature chart. Note the decline following the initiation of vaccine therapy.

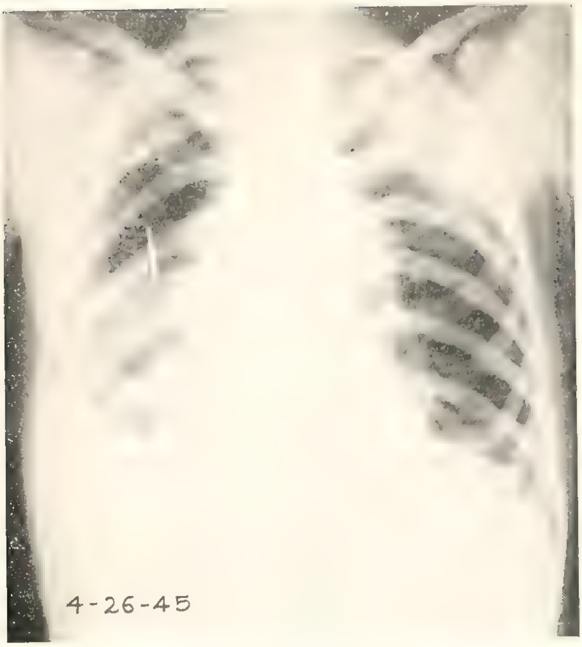

**Fig. 3. Chest film made on the day the autogenous vaccine was begun.**

schedule was followed until the 5 cc. vial was emptied.

On the day following the initiation of the vaccine therapy, the temperature, which had been ranging from 98 to 102.8 F., began to decline (fig. 4). Ten days later it reached 99 F. and continued to run practically a normal course. The sedimentation rate, which was 35 mm. in an hour on March 30, rose to 38 mm. on May 25, then fell to 17 mm. on June 27. By October 26, it was 14 mm. Blood counts made throughout the patient's hospital stay and on return visits are shown in table 1. The eosinophil count* was still elevated—17 per cent—on February 12, 1946.

## *Cases Reported in the Literature*

Bass(1) in 1931 reported a case of "eosinophilic leukemia" in a child 8 years of age. Roentgenograms of the chest showed a sufficient number of generalized speckled shadows throughout both lungs to suggest miliary infiltration. The total white cell count ranged from 26,000 to 47,000, and the eosinophils from 32 to 76 per cent. The patient gained 6½ pounds while in the hospital, and his symptoms and signs disappeared entirely. Nine years later he was perfectly well. The transitory character of the disease and the clinical signs and symptoms would strongly suggest that this case falls into the syndrome which was later described by Loeffler. The history of bronchial asthma mentioned in the case report also tends to support this assumption.

In 1941 Bass reported 2 additional cases of "extreme eosinophilia and leucocytosis."(2). It is difficult to classify these cases properly, since one patient died after leaving the hospital and the other one had no x-ray evidence of pulmonary infiltration. Neither case fulfills the criteria established by Loeffler, unless the one patient showing pulmonary mottling died from another cause.

In 1932 Loeffler of Switzerland first reported transitory pulmonary infiltration associated with eosinophilia, and in 1936 he reported 51 cases which he had observed(1). He described the x-ray findings in the chest as consisting of variable infiltrations which may be unilateral, bilateral, large, small, single, multiple, homogeneous, or spotty. At times one or more lobes of both lungs may be involved. Ordinarily patients with this disease are not very ill. More than 60 per cent of Loeffler's cases were without fever, and 25 per cent were discovered incidentally. Cough is usually, but not always, associated with the syndrome. Sputum is usually scant or absent. The pleura may or may not be involved. Pleuritis with effusion is rare, and if it occurs the amount of fluid is small. Most of Loeffler's cases terminated rather rapidly.

Loeffler recognized that repeated x-ray examinations are necessary for a conclusive diagnosis. Serial films will show the transitory nature of the infiltrations, which may change within a period of time varying from a few days up to two weeks. He felt that the condition results from an allergic state, and he compared it with erythema nodosum. In his opinion the pulmonary shadows are probably due to cellular infiltrations.

Sœderling(3) presented 3 cases, one of which had an eosinophil count of only 4 per cent. All the patients had an asthmatic history, and none were very ill. In one case there was a shifting pulmonary consolidation which appeared first in the right side, then in the left.

Weber's patient(4) was a boy 10 years of age with a vasomotor rhinitis and an opacity in the lower lobe of the right lung. He was sick for two weeks and his temperature did not exceed 99 F. The pulmonary infiltration did not shift. The eosinophil count went to 13 per cent, and continued to be as high as 7 per cent two months after discharge from the hospital. The case was thought to be allergic in nature, and was classified by the author as a case of Loeffler's syndrome. In our opinion, however, this case lacks the most essential criteria of Loeffler's syndrome—shifting pulmonary infiltrations. Furthermore, the eosinophilia did not exceed that frequently encountered in allergic conditions not associated with Loeffler's syndrome.

Freund and Samuelson(5) reported the case of a woman 25 years of age with an eosinophil count as high as 22 per cent. The course of the illness was benign and lasted less than three weeks. The pulmonary infiltrations did not shift from the original site, which was in the middle of the left lower lobe. This patient had a history of asthma. The classification of this case as Loeffler's syndrome is questionable, since no mention of shifting of the infiltration is made.

Baer(6) reported a case of "transient pulmonary edema" in which the lesion was limited to the upper left lobe but became very spotty. The shadow did not shift to any new area. This patient had a history

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*Differential blood counts were made on four sisters and two brothers. One sister showed an eosinophilia (6 per cent), and the others were normal.

1. Bass, M. H.: Eosinophilic Leukemia; Case in Child Aged 8 Years, Am. J. Dis. Child. 41:1394-1402 (June) 1931.
2. Bass, M. H.: Extreme Eosinophilia and Leukocytosis; Unusual Clinical Syndrome of Unknown Origin Occurring in Childhood, Am. J. Dis. Child. 62:68-79 (July) 1941.
3. Sœderling, B.: Transient Lung Consolidation in Asthmatic Children with Reference to Eosinophilia, Arch. Dis. Childhood 14:22-31 (March) 1939.
4. Weber, F. P.: Transient Pulmonary Infiltration with Blood-Eosinophilia (Loeffler's Syndrome), Brit. J. Child. Dis. 36:15-17 (Jan.-March) 1939.
5. Freund, R. and Samuelson, S.: Transitory Infiltration of the Lung with Eosinophilia (Loeffler's Syndrome), Arch. Int. Med. 66:1215-1220 (Dec.) 1940.
6. Baer, A.: Report of a Case of Transient Pulmonary Edema (Loeffler's Syndrome), Ohio State M. J. 37:960-961 (Oct.) 1941.

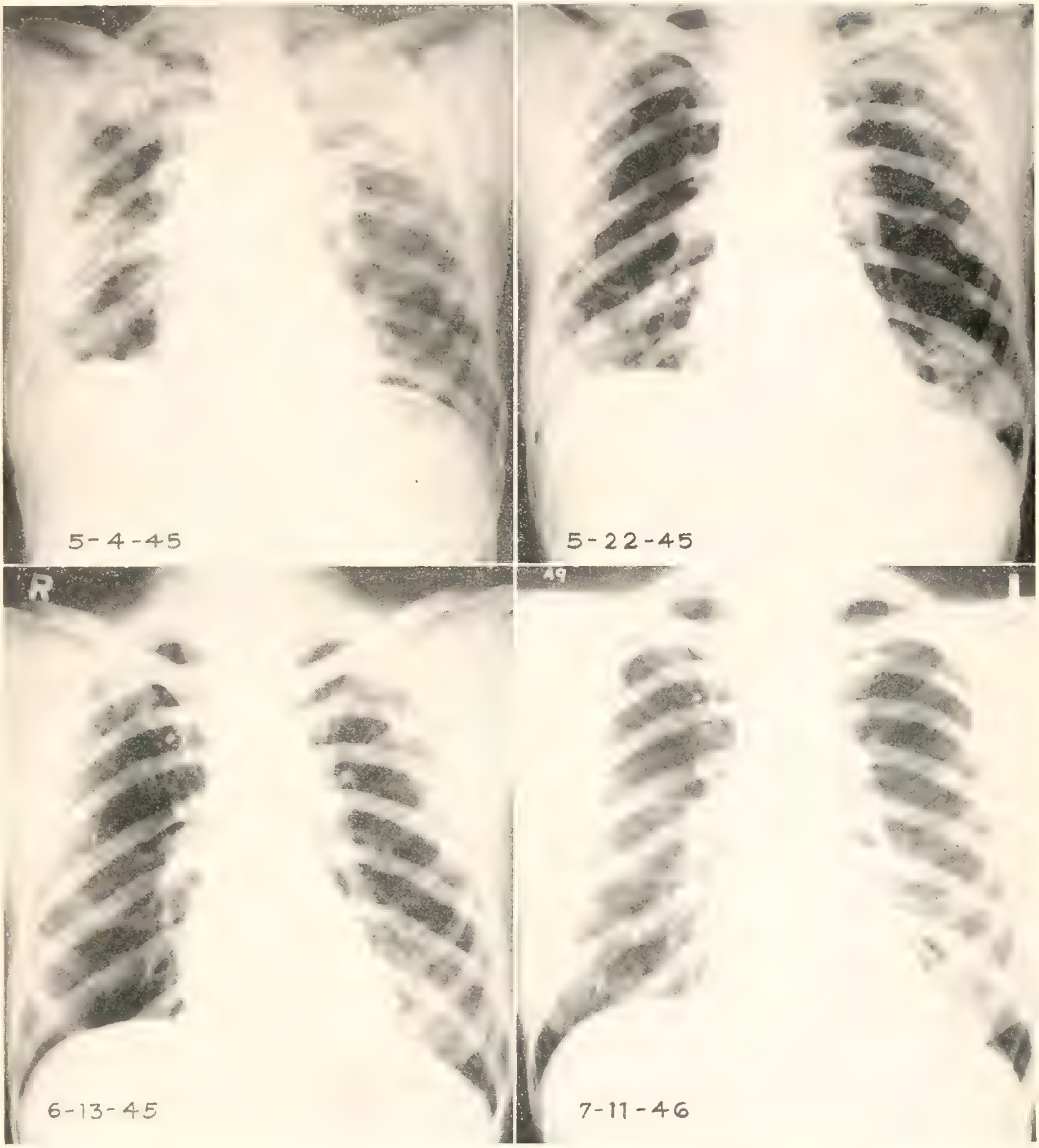

**Fig. 4. Serial chest films made after the autogenous vaccine was begun.**

of asthma, and the lesion was discovered on a routine x-ray examination. The eosinophil count was 25 per cent, but there was no fever, no leukocytosis, and no increase in the sedimentation rate. The discrepancy between the patient's apparent health and the changing pulmonary lesions and high eosinophilia justifies in my opinion the diagnosis of Loeffler's syndrome.

Ryan(7) reported a case of Loeffler's syndrome in a white female, aged 35, who had multiple lesions throughout both lungs and an eosinophil count as high as 34 per cent. The patient was confined to the hospital for a period of two weeks. Because of the severity of the chills and fever it was thought that she probably had Hodgkins' disease, and deep x-ray therapy was given over the lung fields. Several days after this treatment was instituted, the x-ray films showed clearing of the lesions throughout the left lung. Six years later the same patient had another attack of fever and chills, with eosinophil counts as high as 50 per cent. X-ray therapy was again given over both lung fields, with prompt disappearance of symptoms and of the lesions in the lungs. Within a month the eosinophil count had reached a normal level. Ryan stated that there was no allergic manifestation connected with this case.

Jones and Souders(8) reported the case of a 33-

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7. Ryan, J. M.: Loeffler's Syndrome, Minnesota Med. 27:734 (Sept.) 1944.

8. Jones, S. H. and Souders, C. R.: Eosinophilic Infiltration of the Lungs (Loeffler's Syndrome), New England J. Med. 231:356-358 (Sept. 7) 1944.

year-old Negress with eosinophil counts as high as 48 per cent. This patient showed signs of asthma, and on occasions received ephedrine. The roentgenographic changes shown in their article are consistent with shifting infiltration.

Hennell and Sussman(9) presented 5 cases, all of which fulfilled the accepted criteria for Loeffler's syndrome. One patient, a girl of 19, showed electrocardiographic changes suggestive of myocardial damage; she died of myocardial failure. All 5 patients gave a history or showed signs of bronchial asthma.

Karan and Singer(10) reported 5 cases of pulmonary infiltrations which were mistaken for tuberculosis. Two of these cases had an eosinophilia with transitory lung infiltrations, and were classified as cases of Loeffler's syndrome. Both these patients gave a history of asthma.

In Peabody's case(11) the eosinophil count went as high as 63 per cent, and was never lower than 14 per cent. The pulmonary infiltrations were transitory and migratory in character, and involved both lungs. This patient had a history of asthma and was admitted to the hospital on three occasions. The marked changes demonstrated by x-ray were distinctly out of proportion to the physical findings.

Pirkle and Davin(12) reported the case of a white housewife, 54 years of age, who was sick from August until May with eosinophil counts ranging as high as 33 per cent. The pulmonary infiltrations were transitory, and in the beginning of the illness pleural effusion was present. There was no history or symptoms of asthma. The eosinophil count in this case decreased to 5 per cent after the clinical symptoms and roentgenographic changes disappeared.

Smith and Alexander(13) in 1939 reported a case of shifting pulmonary infiltrations with eosinophilia in a white girl 7 years of age. The eosinophil count at one time was as high as 54 per cent. In addition, however, beta hemolytic streptococci were cultured from the blood. The differential blood count changed, and in the terminal stage of the illness the lymphocyte count varied from 91 to 100 per cent. The child expired, and an autopsy was performed by Dr. W. C. Merkel. A definite diagnosis could not be established, although leukemia and septicemia seemed to be most likely. The possibility that this was a case of Loeffler's syndrome was questioned by a number of authors.

J. H. Smith's patient(14) was a woman aged 55 who had shifting lung infiltrations and eosinophilia (as high as 69 per cent). There was a definite history of asthma, and an "extensive series of allergy skin tests gave negative results for reactions to bacteria related especially to the respiratory tract."

Serra(15) reported the case of a 45-year-old white female who was observed over a period of thirty-two months. She had four separate attacks during this time, and later had another attack which continued for twenty-six months. The eosinophil count reached a level of 74 per cent. The patient had hives and eczema.

Gottdiener(16) reported 2 cases occurring in soldiers overseas. One patient, an asthmatic, had an eosinophil count of 11 per cent and was ill on two occasions with infiltrations in different lungs. The second patient showed only a small infiltration in the right upper lobe which subsided in two days; the eosinophil count was only 8 per cent. This case cannot be accepted as one of Loeffler's syndrome.

Slowey(17) reminded us that trichinosis should be considered in the differential diagnosis of Loeffler's syndrome. He presented one case in which there was transitory lung infiltration with eosinophil counts as high as 34 per cent. Trichinae were found on biopsy of the deltoid muscle. There was no history or symptoms of asthma in this case.

Hoff and Hicks(18) reported a case of transient infiltrations and eosinophilia (as high as 41 per cent) in a white female aged 40. Endamoeba histolytica was found in the stools but not in the lung. Under emetine therapy, the lung infiltrations and eosinophilia disappeared. These authors believe that the amebae furnished the allergens which caused the symptoms.

J. Edward Berk(19) called attention to the fact that patients infested with Necator americanus or Strongyloides may have transitory pulmonary infiltrations.

Engle reported an epidemic of transitory lung infiltrations in China during May and June, when the privet is in flower(15). On two occasions he himself developed similar symptoms, with an eosinophil count of 20 to 25 per cent and roentgenographic evidence of massive pulmonary infiltrations. The pulmonary consolidations disappeared within twenty-four hours on the first attack and within six days on the second.

Alpher(20) reported 2 cases of Loeffler's syndrome. The first was in an asthmatic patient, who had two attacks. The second patient was known to have hay fever, and it was thought that the infiltration in the lung was due to sensitivity to the ragweed pollen.

Bayley, Lindberg and Baggenstoss(21) reported a case of Loeffler's syndrome in which the lungs were examined at autopsy. The most striking features were the predominance of eosinophilic leukocytes in the pulmonary exudate, the advanced organization of this exudate, the granulomatous focal lesions, and the presence of marked vascular lesions. Hypertrophy of the media and thickening of the intima resulted in a decrease in the vascular lumen. The small arteries were necrotized and contained arterioliths, suggesting a relation to periarteritis nodosa.

### *Diagnosis*

The findings essential to a diagnosis of Loeffler's syndrome are (1) shifting pulmo-

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9. Hennell, H., and Sussman, M. L.: The Roentgen Features of Eosinophilic Infiltrations in the Lungs, Radiology 44:328-334 (April) 1945.
10. Karan, A. A., and Singer, E.: Transitory Pulmonary Infiltrations Mistaken for Tuberculosis, with a Report of 5 Cases, Ann. Int. Med. 17:106-124 (July) 1942.
11. Peabody, J. W.: Transitory Migratory Pulmonary Infiltrations Associated with Eosinophilia (Loeffler's Syndrome), Dis. Chest. 10:391-406 (Sept.-Oct.) 1944.
12. Pirkle, H. B. and Davin, J. R.: Loeffler's Syndrome; Transient Pulmonary Infiltrations with Blood Eosinophilia, Am. Rev. Tuberc. 50:48-51 (July) 1944.
13. Smith, D. C. W., and Alexander, A. J.: Transitory Lung Infiltrations Associated with Eosinophilia. (Loeffler's Syndrome), South. M. J. 32:267-273 (March) 1939.
14. Smith, J. H.: Loeffler's Syndrome, South. M. J. 36:269-271 (April) 1943.
15. Serra, L. M.: Loeffler's Syndrome; Review of Literature and Report of Case, Bull. School Med. Univ. Maryland 30:11-31 (July) 1945.
16. Gottdiener, E. E.: Diagnosis of Loeffler's Syndrome; Transient Lung Infiltration with Eosinophilia, New York State J. Med. 45:2179-82 (Oct. 15) 1945.
17. Slowey, J. F.: A Case of Transient Successive Pulmonary Infiltration (Loeffler's Syndrome) Associated with Trichiniasis, Ann. Int. Med. 21:130-135 (July) 1944.
18. Hoff, A., and Hicks, H. M.: Transient Pulmonary Infiltrations; a Case with Eosinophilia (Loeffler's Syndrome) Associated with Amoebiasis, Am. Rev. Tuberc. 45:194-199 (Feb.) 1942.
19. Berk, J. E.: Transitory Pulmonary Infiltrations, Letter to the Editor, J.A.M.A. 127:354 (Feb. 10) 1945.
20. Alpher, I. M.: Loeffler's Syndrome: Report of 2 Cases, 1 with Recurrent Features, and 1 Associated with Hay Fever, J. Allergy 18:47-50 (Jan.) 1947.
21. Bayley, E. C., Lindberg, D. O. N., and Baggenstoss, A. H.: Loeffler's Syndrome; Report of a Case with Pathologic Examination of the Lungs, Arch. Path. 40:376-381 (Nov.-Dec.) 1945.

nary infiltrations demonstrable roentgenographically but producing few, if any, physical signs; (2) eosinophilia. Fever, malaise, pleuritis, productive or non-productive cough and allergic phenomena, especially bronchial asthma, may or may not be present.

Because of the absence of what we consider to be obligatory findings a certain number of reported cases cannot definitely be accepted or classified as belonging to Loeffler's syndrome. We particularly refer to the 2 cases reported by Bass, the 2 reported by Söderling, and the single cases reported by Weber, Freund and Samuelson, Smith and Alexander, and Gottdiener. In evaluating these reports, however, it should be taken into consideration that repeated x-ray studies, which would reveal a shifting character of the infiltrations, may not have been made. Thus in reality some of these cases may rightfully belong to be classified as Loeffler's syndrome.

In the *differential diagnosis* the following conditions should be considered: (a) pulmonary infiltrations without eosinophilia (virus pneumonia, tuberculosis, and metastatic malignancy); (b) pulmonary infiltrations with eosinophilia (trichinosis, amebiasis, ascariasis, and other parasitic infestations).

Virus pneumonia may resemble Loeffler's syndrome more closely than any other condition mentioned. Not only is there a close similarity in the pulmonary changes demonstrated by x-ray examination, but there is also, in both conditions, a striking disproportion between the physical and x-ray findings. Patients with virus pneumonia, however, do not have eosinophilia, and the x-ray densities ordinarily do not shift.

### *Pathogenesis*

Little is known concerning the pathologic basis of Loeffler's syndrome. There has been some speculation as to whether the densities seen on chest films are due to intra-alveolar infiltration (bronchopneumonia) or to interstitial infiltration. Von Meyenburg of Switzerland reported 4 cases of Loeffler's syndrome in which actual bronchopneumonia was found at autopsy. The author stated, however, that no explanation for the transitory character of the lung lesions could be given. Meyenburg's observations proved for the first time that the lesions in Loeffler's syndrome are actual areas of bronchopneumonia rather than anaphylactic edema or interstitial pneumonia, as has been assumed by others.

The number of postmortem examinations, however, is too limited for final conclusions to be drawn. It is my opinion that the most plausible explanation for the transitory nature of the roentgen densities is that they are due to atelectases. This explanation would not contradict von Meyenburg's findings, since any area of atelectasis may result in bronchopneumonia. A review of the x-ray films of our case appears to substantiate this theory. A definite shift of the mediastinum, as well as narrowing of the intercostal spaces, can be observed. It is not unlikely that these atelectatic foci are due to obstruction of bronchi by excessive mucous secretion. This theory is borne out by the fact that many patients with Loeffler's syndrome gave a history of bronchial asthma.

Bayley and others(21) have recently described the clinical course and autopsy findings in a case of Loeffler's syndrome, and have stated that the pulmonary lesions are not transitory in all cases. It is apparent that the lesions which these authors described in their case are inconsistent with the shifting nature of the x-ray densities which is so characteristic of the vast majority of cases of Loeffler's syndrome. The question therefore arises whether the granulomas, vascular lesions, and exudates observed in this instance can be regarded as the specific pathologic basis for Loeffler's syndrome. It is reasonable to assume that the changes observed were, as Bayley and his co-authors implied, the result of an allergic reaction. They serve to establish the relationship of Loeffler's syndrome to bronchial asthma and other allergic conditions such as periarteritis. It is our opinion, however, that lesions of this type are rare in Loeffler's syndrome, inasmuch as they are incompatible with the characteristic rapidly changing x-ray densities. We therefore feel that the findings in Bayley's case do not contradict our assumption that atelectases are the most significant clinical diagnostic factor.

### *Summary*

A typical case of Loeffler's syndrome which has been observed for twelve months is reported. The eosinophilia still continues after an absence of symptoms for eleven

months, and the eosinophil count ranges from 15 to 23 per cent. It is emphasized that the x-ray changes observed are not in proportion to the physical findings.

There is considerable confusion in the literature regarding the pathogenesis of Loeffler's syndrome. We believe that the pulmonary densities are actually due to atelectases, which may possibly be followed by foci of bronchopneumonia.

A review of the English literature reveals that out of 16 cases accepted as Loeffler's syndrome, 14 had asthma or a history of asthma, and 1 had urticaria. It is therefore believed that the condition is hyperergic in nature.

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## ACUTE PRIMARY ILEO-ILEAL INTUSSUSCEPTION IN AN ADULT

### *Report of a Case*

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Washington

Acute intussusception is primarily a disease of infants and young children. Approximately 90 per cent of all reported cases have occurred in children below the age of 5 years, and 50 per cent have occurred during the first year of life.

Intussusception in children is usually explained by the fact that the mucosal folds of the intestine are excessively developed and studded with lymphoid follicles. When this condition is coupled with hyperperistalsis, the anatomic basis for intussusception is provided(1).

In adults, however, this combination of factors does not occur, and for this reason primary intussusception is quite rare. The usual cause of intussusception in adults is a tumor within the intestinal lumen, a Meckel's diverticulum, or the vermiform appendix. Newton and Botsford(2) reported only 5 cases of intussusception occurring in adults at the Peter Bent Brigham Hospital between 1913 and 1940; of these, only one was considered primary. Whatever the cause of intussusception in an adult, it rarely presents the classical picture seen in children.

A case of acute ileo-ileal intussusception in an adult, with no demonstrable etiologic agent, is reported below.

### *Report of Case*

A white married woman, aged 22, entered the Tayloe Hospital on June 13, 1947, at 5:15 p.m., complaining of severe lower abdominal pain of approximately twelve hours' duration. The patient stated that she was awakened about 5 a.m. on the day of admission by rather severe pain in the lower abdomen, accompanied by nausea and vomiting. The pain increased in severity until about 9 a.m., at which time she was seen by her family physician. A flat plate of her abdomen was made and suggested the possibility of a small ureteral calculus. She was given a hypodermic of morphine and advised that if the pain persisted she should enter the hospital.

She stated that shortly after the onset of her pain she noticed a mass in her lower abdomen which had increased only slightly in size since then. She had had a normal bowel movement the night before the onset of her symptoms, and gave no history of constipation or abdominal pain in the past. There were no genito-urinary symptoms. Her last menstrual period began on June 8 and stopped the day before admission. She stated, however, that she did menstruate slightly after leaving the doctor's office on the morning of admission.

The hypodermic gave some relief, but since the pain returned in a few hours, she entered the hospital for further examination. At this time the pain was less severe but she said that the entire lower abdomen was extremely sore.

Physical examination on admission revealed a young white woman who appeared quite ill and who was apparently suffering with rather intense lower abdominal pain. She was pale, and the skin was cold. Some degree of shock appeared to be present, although her blood pressure was 120 systolic, 70 diastolic. The pulse was 88, the temperature 100 F. Examination of the nose and throat was negative, and the heart and lungs were entirely normal. Examination of the abdomen revealed a tumor mass which extended from the pelvis almost to the umbili-

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From the Surgical Service of the Tayloe Hospital, Washington, North Carolina.

1. Hinton, J. W.: Acute Primary Intussusception in the Adult, Ann. Surg. 84:100-103 (July) 1926.
2. Botsford, T. W. and Newton, F. C.: Intussusception in an Adult Due to Submucous Lipoma of the Ileum, Surgery 10:265-269 (August) 1941.

cus. This mass was smooth in outline, slightly movable, and quite tender. On pelvic examination the uterus could not be palpated, but a mass could be felt which appeared to arise from some pelvic organ. Any motion of the cervix caused exquisite tenderness.

The white blood cell count was 18,200, the red cell count 3,550,000, the hemoglobin (Sahli) 79 per cent. A catheterized specimen of urine was negative.

A diagnosis of probable twisted ovarian cyst was made, and laparotomy was advised. The operation was performed under nitrous oxide, oxygen, and ether anesthesia. When the peritoneal cavity was opened, a considerable amount of straw-colored fluid escaped. Immediately visible was an enormously distended loop of intestine which had lost its normal luster. This loop was delivered through the incision and was found to be lower ileum, which was invaginated upon itself for a distance of approximately 18 inches. This invagination had occurred about 12 inches from the ileocecal valve. By gentle pressure the intussusception was reduced with some difficulty. The bowel, which first appeared quite dusky, immediately regained its normal color upon the application of warm towels. The involved segment of bowel was inspected closely for any tumor mass, but none was demonstrable. There were no abnormal glands in the mesentery, and no evidence of a Meckel's diverticulum. Since no other surgery was indicated, the abdomen was closed.

The patient's postoperative course was much smoother than had been anticipated. There was no postoperative distention or vomiting, and she was allowed out of bed the day after operation and discharged on the sixth postoperative day.

When she was seen in the outpatient department two weeks after her discharge, she had no complaints and apparently had completely recovered.

### *Summary*

An acute ileo-ileal intussusception occurring in a young woman is reported. It was apparently primary in nature, since no pathologic lesion was demonstrable at the site of the intussusception.

# Maternal Welfare Section*

## CASE REPORTS FROM THE MATERNAL WELFARE RECORDS

### *The Responsibility of the Hospital*

The responsibility of an institution for the quality of the care received by its patients is widely recognized. The American College of Surgeons and the Council on Medical Education and Hospitals of the American Medical Association are standardizing agencies which are organized primarily to see that the hospitals meet this responsibility.

A review of the maternal deaths which have occurred in North Carolina during the past year shows that our hospitals have a creditable record for care of obstetric patients. Two major deficiencies exist, however. One is the difficulty of obtaining and administering whole blood to the patient who suffers from blood loss. The second deficiency is that it is often difficult to arrange for the surgical treatment of an intra-abdominal emergency during the usual hours of scheduled work. Errors in judgment on the part of the operating room supervisor may easily have fatal consequences in such cases.

A record recently reviewed by the Maternal Welfare Committee illustrates clearly the importance of each defect in causing an unnecessary maternal death.

### *Case Report—N. C. M. W. C. 222*

A married colored woman, 22 years of age, was referred to a small North Carolina hospital on June 26, 1947, complaining of mild to moderate vaginal bleeding of three weeks' duration. She also had noticed mild lower abdominal pain. Her menstrual periods had been regular prior to the onset of the continuous bleeding, and she had not missed a period.

The general examination revealed an obese young colored woman who was not acutely ill. Her blood pressure was 140 systolic, 90 diastolic, and no specific physical abnormalities could be determined. Pelvic examination was unsatisfactory because of her obesity, but revealed no unusual findings. Laboratory examinations of the blood and urine were normal.

Her physician listed incomplete abortion, ectopic pregnancy, and submucous fibroid tumor as possible diagnoses. She was observed for forty-eight hours; on June 28, a dilatation and curettage was done. A moderate amount of endometrial tissue was obtained

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*Prepared by the Maternal Welfare Committee of the Medical Society of the State of North Carolina:

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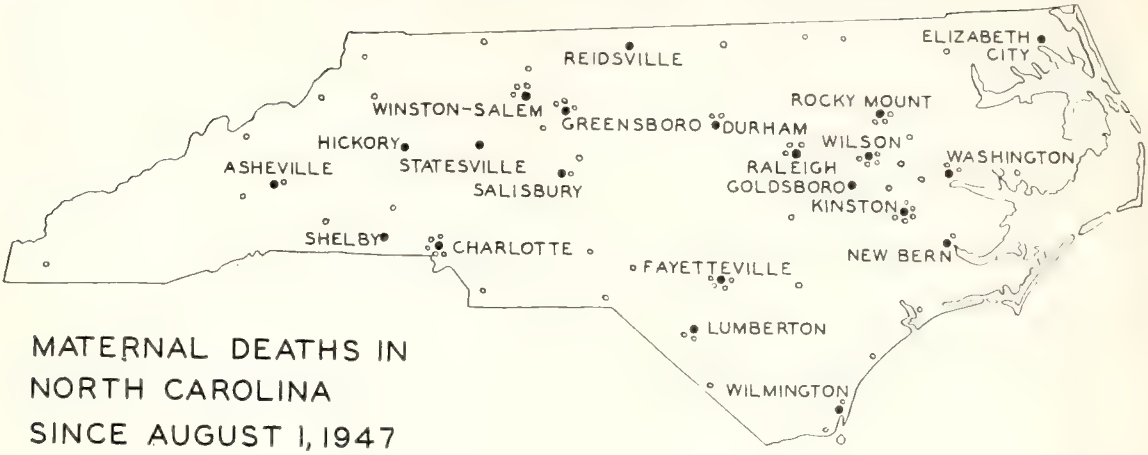
MATERNAL DEATHS IN NORTH CAROLINA SINCE AUGUST 1, 1947

for pathologic examination. The pelvic examination under anesthesia was inconclusive, but submucous fibroid tumor was ruled out as a cause for her bleeding.

On the morning of July 1, she complained of the sudden onset of very sharp, severe pain in the left lower quadrant of the abdomen. A diagnosis of ectopic pregnancy, with rupture of the fallopian tube and intra-abdominal hemorrhage, was made immediately. Since the operating room was busy with regularly scheduled work, operation was postponed until 1:35 p.m. By this time her blood pressure was not obtainable, and she was in profound shock. Blood plasma was administered continuously during the operation. A salpingectomy was done rapidly under general anesthesia and completed at 2:15 p.m.

Following the operation, the patient received 650 cc. of whole blood by transfusion. Blood, blood plasma, or fluids were given intravenously each day during the remaining five days of her life. The patient also received 20,000 to 40,000 units of penicillin every four hours during the postoperative period. She never regained her mental facilities, however, and her course was progressively down hill. Her temperature rose gradually and she died on July 6.

The condition of the patient's abdomen was satisfactory during the terminal period of her illness, and her physician recognized that death was due to irreversible shock or to irreparable cerebral damage occurring during the prolonged period of profound shock.

### *Discussion*

The diagnosis of an ectopic pregnancy may be one of the most difficult in medical practice. An unruptured ectopic pregnancy may be impossible to diagnose, particularly in the presence of obesity. The conservative management of this case pending an accurate diagnosis was fully justified. The patient's life would have been saved easily if blood in large quantities had been available for immediate administration when rupture of the ectopic pregnancy occurred, and if an operation to control the bleeding had been performed quickly.

*Instead, a delay of hours occurred, because of the crowded operating room schedule,* and she received her first blood transfusion hours after the intra-abdominal bleeding began.

It has been noted that 47 of the first 175 consecutive maternal deaths studied by the Maternal Welfare Committee resulted directly from hemorrhage. Thirty-six of these patients received no blood transfusions. Not one of the 11 who were given a transfusion received a quantity sufficient to replace the blood which was lost. The Committee will discuss this serious problem fully in the near future.

The importance of the use of sound judgment by the personnel of our hospitals in the care of emergencies is illustrated by this record. The record does not represent a unique case. The operating room supervisor and the regular surgical staff are greatly inconvenienced when an emergency operation must be performed during the hours of regularly scheduled work. It must be recognized, however, that a life may be lost unnecessarily if a delay occurs in the care of the bleeding patient. Our hospital administrators and operating room supervisors have the chief responsibility in solving this problem.

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**Psychiatry has no scientific test for fraud.** It cannot differentiate the malingerer from the psychoneurotic person by an objective method nor can it quantitatively assess the degree of conscious exaggeration of symptoms by one who is troubled with a functional disability. And yet, in dealing with large groups of men, moral virtues and defections become obvious. In the unscientific past, . . . the realm of the diseased psyche was unexplored and abnormalities of behaviour were explained solely on moral bases. Now it would appear that the pendulum of psychiatric opinion has swung too far in the direction of man, the biologic automaton, and that psychiatric terminology has been perverted to uses in the field of ethics so that man can neither be cowardly nor weak and so never can be enduring or courageous.—Alexander R. MacLean: "No Disease," Canad. M. Assoc. J. 56:324 (March) 1947.

# THUMBNAIL SKETCHES OF EMINENT PHYSICIANS

JOSIAH C. TRENT, M.D., F.A.C.S., *Editor*

DURHAM

## OBSTETRICS AND GYNECOLOGY IN AMERICA

### XII

### THE TWENTIETH CENTURY

In reading this series of "Thumbnail Sketches" of the men who have made distinct contributions to obstetrics and gynecology in this country, one is impressed by the tenacity, purposefulness, ingenuity, and intellectual ruggedness of these leaders. It is reassuring to find these qualities in equal degree and far more widespread among the workers of this century. The day of the giants is not over; perhaps the giant is more commonplace. The change has been in placing emphasis on a department, a system, or a group, rather than on an individual. How else could such a man as the late J. Whitridge Williams have seen thirteen of his students made heads of departments in various medical schools during his lifetime? The Sloane Maternity, the Women's Hospital and the Lying-In in New York, the Chicago Lying-In, Boston Lying-In, Pennsylvania Lying-In, and many other institutions have gained renown as much for the products of their training as for the men who gave the training. The wisdom of combining obstetrics and gynecology has become manifest; the combination has brought about flexibility of teaching, a saving of curriculum and man hours, and, most important, the placing of proper emphasis on the sick or pregnant woman and on the necessity of restoring her to a normal anatomic and physiologic state.

Nowhere has the combined effort been more productive than in the painstaking work of Smith, who, by "opening" the pituitary, aided Engel, Evans, Allen, Doisy, Pratt, Collip, and many others to advance female sex endocrinology. The side effects, direct and indirect benefits, are just beginning to be realized. This newest approach to therapy will eliminate some of the procedures, operations, and modes of treatment that brought fame to our professional forebears. The anatomic school accepted the bacteriologist and pathologist and made modifications. The physiologists pointed to their approach and were later joined by the biologic chemists; these groups have elaborated the endocrine aspects. The twentieth-century specialists have the advantage of the combined knowledge of all the sciences. The next natural addition is psychosomatic medicine. All of these complicating factors make the simple problem of the "Thumbnail" precursors, "to operate or not to operate," an enviable one.

Much work has been done in the hope of finding obstetric anesthetic and analgesic agents that meet the rigid requirements of availability, ease of administration, and lack of harmful after-effects to the mother or ill effects to the newborn. The pediatricians and physiologists have joined in the study. The ideal agent has not yet been found. Gwathmey and Davis with rectal ether, Kane with paraldehyde, Pitkin and Cosgrove with spinal anesthesia, and more recently Hingson with continuous caudal anesthesia have followed the "twilight sleep" era which had and has its strongest advocates at Barnes Hospital in St. Louis.

New obstetric forceps have been perfected, but they have been for a special purpose, as the Piper forceps for the aftercoming head and the Barton forceps for rotation of the head. The practice of routine version and extraction has had advocates, led by an excellent obstetrician, Potter of Buffalo. This is nothing new, however: a notorious Mr. Figg in England used such a method over a century ago, but infection unhorsed him. Hirst, Cooke, De Lee, and more recently Waters have tried modifications of the old extraperitoneal cesarean section. It is now a helpful recourse in complicated obstetrics. X-ray pelvimetry has ceased to be an excuse for cesarean section; by the suggestion of Toms, Caldwell, Malloy, D'Sopo, and Torpin, the course of labor can be fairly well predicted.

Even before the discovery of the efficient chemotherapeutic agents, there was a tendency toward more extensive surgery, especially in genital malignancy. These new drugs are an aid, not by permitting careless and injudicious operation, but by allowing more latitude in the application of curative measures.

Early in the century there was great optimism regarding radium and x-ray in the treatment of genital cancer. Kelly, Clarke, the Memorial Hospital, Schmitz, and others made encouraging reports. The x-ray has increased in volts from thousands to millions, varied modes of exposure and treatment have been devised, and radium has been used in all types of screening, application, and treatment; yet the salvage rate in this specialty remains about 30 per cent. It is the consensus of opinion that within a specialty there should be one member who is responsible for the diagnosis and treatment of malignancy. It is well known that certain tissues are radio-sensitive and others are not. In the latter category and in early malignancy there is a place for surgery. Recently, led by Meigs, there has been a wider application of the radical operations of Wertheim, Bonney, and Taussig. The solution of pelvic malignancy is not yet at hand.

As a helpful screen, like the routine microfilm of the chest for tuberculosis, the routine cytologic study of vaginal smears for detecting early uterine and vaginal malignancy has been developed by Papanicolaou and Traut. The stained cells are also an index to ovarian activity and possible pregnancy. The most unattractive feature of this method has been, as is often true, the associated lay publicity. The method has real merit.

Another scientific finding that has been seized on by the lay press and that has caused concern in the female patient—concern which of course has been passed on to the doctor—is the discovery of the Rh factor. Actually its chief application is in the prevention of transfusion reactions; but every miscarriage and stillbirth is, in the patient's mind, apt to be intimately tied up with Rh negativity. Time is needed to evaluate what is known and what can be done.

In summary, the problems in obstetrics and gynecology remain the same, and the solutions cannot be translated in terms of medical care alone. Infection has been lessened; the toxemias of pregnancy can be prevented; and obstetric hemorrhage can be anticipated and adequately treated if the patient is under a doctor's care. The only known cure for malignancy is early diagnosis and immediate treatment. In many ways this century is more fortunate than the last: the profession is more medically articulate, and, in spite of the "horse and buggy" halo, equally altruistic; there are an enlightened populace, receptive law-makers, and interested philanthropists, who are anxious to see that the healthy foundation of the pioneers, the painstaking work of the medical artisans, and the imagination of the scientific thinker are translated in terms of lowered maternal and fetal mortality and of well adjusted women.

—Robert A. Ross, M.D.
Durham, North Carolina

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**Specialty boards and family practice.**—Some concern has been expressed over the great increase in physicians who are taking board examinations because it is feared that soon there may be too many specialists. Here again, it would seem that we may safely depend on the law of supply and demand. Certainly the desire to acquire additional preparation and facility in a branch of medicine is to be encouraged, rather than condemned; the public will gain in better quality of service. There is, however, complaint from many patients, that the young doctor having passed his board, now feels that he is relieved of all obligation to care for his patients in their homes when they are unable to come to him. While the younger physician must conserve his time and strength if he is to continue to grow in medicine, he should not forget that the greatest gratification in the practice of medicine is the close patient-physician relationship of the family doctor. He will do well not to allow a false estimate of his own dignity, nor too much solicitude for his own convenience, or for financial gain, to rob him of this jewel among the rewards of medicine. He should not assume that by improving his qualifications for the practice of medicine, he has disqualified himself as family advisor and friend. His experience will be greatly enriched by his observation of even minor illnesses in the home. The better prepared physician of the future will still retain the ideals of medicine; the family doctor will not have passed—he will have improved.—Ernest E. Irons: Medicine and Education, Ann. Int. Med. 25: 235 (August) 1946.

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**The growth of both specialization and organization** restricts freedoms formerly enjoyed by many individuals. Specialization does this less than organization but the two cannot be wholly dissociated. The reluctance of intelligent individuals to lose liberties which they previously enjoyed is not motivated entirely by personal reasons. The latter are not to be ignored, but it is also true that good social reasons exist for keeping as much individual freedom as possible in our social order. A good society requires good individuals, and an atmosphere of freedom is needed for the highest development of personality and character. Furthermore, scientific progress was made possible only because of social movements for greater individual liberty. If we are to have continued development of scientific medicine, the freedom of physicians must be respected within as wide limits as possible.—Evan W. Thomas: The Increasing Complexities of Medical Care, New York Medicine 3:22 (June 5) 1947.

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DECEMBER, 1947

## DR. FRANK ALEXANDER SHARPE

"Death loves a shining mark." The truth of this adage seemed to be borne out by the Home-going of Dr. Frank A. Sharpe, president of the Medical Society of the State of North Carolina, on November 21. It is hard for his friends to realize that he has gone. He always appeared so full of energy that it was impossible to associate him with the thought of illness. No doubt he would have chosen to go as he did, at the completion of a full day's work; but the tragic suddenness of his death left his family and his friends dazed.

Frank Sharpe had taken up the duties of his office as president of the State Society with his characteristic whole-hearted enthusiasm. Even before being installed as president, he had sought a personal interview with Mr. Richards Tufts, owner of the Carolina Hotel at Pinehurst, and had made arrangements for the 1948 meeting of our Society to be held there(1).

In the passing of Frank Sharpe, the medical profession of North Carolina has lost more than his leadership as president of the State Society. His high ideals, his professional ability, his unswerving loyalty to his friends, and his great personal magnetism will be sorely missed in the years to come.

Although his funeral services were held on a dreary, rainy Sunday afternoon, the large auditorium of the First Presbyterian Church in Greensboro was filled to overflowing by his patients and his friends, both doctors and laymen. No greater tribute could have been paid to any man than the simple statement of one of his patients: "He meant so much to so many people that I wish I could have gone in his place."

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1. Our State Medical Society and Pinehurst, Editorial, North Carolina M. J. 8:374 (June) 1947.

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## PRESIDENT JAMES F. ROBERTSON

In accordance with the By-Laws of our State Society, the vacancy left by the passing of President Frank Sharpe has been filled by the president-elect, Dr. James F. Robertson of Wilmington. Our Society is fortunate in having one so well qualified to hold the position of leadership for the next year and a half.

It is an interesting coincidence that Dr. Robertson was born in Virginia, and that he was elected at the only meeting of the Medical Society of North Carolina ever held in Virginia. Like many other Virginians, however, Dr. Robertson—or his parents—chose to live in North Carolina. He was brought up in Charlotte; obtained his medical degree from the University of Pennsylvania; and, except for time out to participate in the first World War, has practiced general surgery in Wilmington all his professional life.

To President Robertson the NORTH CAROLINA MEDICAL JOURNAL pledges its full support. Though he has had only slightly more than half the usual time to prepare for the duties of the presidency, his friends are confident of his ability to do the job well.

## THE WOMANPOWER SHORTAGE

When Henry Wallace's book prophesying postwar jobs for sixty million people was published, it provoked various reactions. The most frequent was mild amusement. Few thought that employment would be maintained at such a saturation point for long after the war. Now, however, some are expressing concern over the apparently hopeless task of getting enough manpower for the work that needs to be done.

The word "manpower" includes, of course, female as well as male workers. A little reflection, in fact, leads one to wonder if women are not needed more than men; or, to be literal, if there is not a greater shortage of womanpower than of manpower. Most of our teachers are women, and the public schools are crying for capable young women to fill the vacancies in their sadly depleted faculties. If possible, there is an even greater need for womanpower in the nursing profession.

It seems only yesterday that the supply of nurses was so plentiful that they were being used as hostesses on passenger planes. The nursing profession was so highly esteemed that the applications for admission to our best training schools far exceeded the number that could possibly be accepted, and more were turned away than were admitted. Within a short time the picture has changed. Now even the largest schools of nursing are finding it hard to procure enough high school graduates to fill their classes, and many of the smaller hospitals fear that they may have to discontinue their training schools altogether.

The *Journal of the American Medical Association* for November 8 has an encouraging word from Miss Ruth Sleeper, president of the National League of Nursing Education. Miss Sleeper reports "that the nationwide enrolment of student nurses this year is expected to reach the peacetime peak of 41,000 established in 1941; . . . that the shortage is actually due to the large increase in the number of patients."(1)

In spite of this optimistic report, all doctors in practice, and all hospital administrators know that, not since the influenza pandemic of 1918, have nurses been in such demand. Long ago the airlines discontinued the practice of using nurses as hostesses, but various agencies of our government are employing so many nurses that civilians in private life have to do without. Many young women who would formerly have entered the nursing profession have been tempted by the abnormally high salaries paid for clerical work or for other jobs more or less temporary in nature.

The family doctors of North Carolina—as of every other state—have a wonderful opportunity to encourage girls in high schools and colleges to become nurses. The directress of one of the larger training schools in the state recently said that she had been impressed with the fact that so many members of this year's freshman class of student nurses had been influenced by their family doctors to enter the nursing profession.

There are many reasons why nursing should appeal to young women. First, of course, is the knowledge that it offers an opportunity for service unsurpassed by any other calling. Every doctor who has seen the steadying influence of the trained nurse can say with Osler: "At your word I have seen order and quiet replace chaos and confusion, not alone in the sick-room, but in the household."

In addition to serving humanity, the nurse can also do fairly well for herself. Few other professions afford equal matrimonial possibilities. Probably no other offers better preparation for married life and the rearing of children. Few careers hold more guarantee of security. Even though file clerks and receptionists may now be getting better salaries than nurses, it will not always be thus; many jobs that are now remunerative will be abolished altogether or will pay much smaller wages when our present pseudo-prosperity comes to its inevitable end. The capable nurse, however, can always be assured of employment, and of a reasonably good income.

Another inducement to enter training now is that nursing hours are shorter, and more time is available for recreation and relaxation. Furthermore, the drudgery formerly required of student nurses is no longer part of a nurse's training.

All in all, the nursing profession is one of the most attractive of all. Let us tell the prospective training-school candidate of its advantages, and so do our part to overcome the womanpower shortage.

---

1. Nurse Shortage Reported to Be on the Wane, Washington Letter, J.A.M.A. 135:619 (Nov. 8) 1947.

FRANK ALEXANDER SHARPE, M.D.

September 27, 1889 November 21, 1947

## DIABETES, DROPSY, AND DANGER

Some publications take pride in the quality of their advertising, and make a sincere effort to keep out any false or misleading claims. Others apparently apply the principle of "*Caveat emptor,*" or "Let the buyer beware." Recently there have appeared a series of newspaper advertisements by chiropractors which obviously are accepted on the latter principle. Two recent examples are advertisements published in the Winston-Salem *Twin City Sentinel,* one discussing diabetes, the other dropsy. Both will be highly enlightening to doctors of medicine.

Members of the medical profession will be interested to know, for example, that there is a simple method of treatment for diabetes by which "about seventy per cent of cases recover completely," and that "Cases of long standing have been completely cured in a remarkably short time." Insulin is referred to as only a palliative measure. The cause of diabetes, we are told,

> "lies in an impinged nerve in the spinal column. The impingement prevents normal transmission of nerve energy to the organs of digestion so that these organs do not properly prepare the sugars for assimilation by the body. As soon as the adjustments have removed the pressure from the nerves, normal transmission of nerve force is restored and the body can then assimilate the sugars again."

The discussion of dropsy is, if possible, even more startling. The reader is informed that dropsy is caused by failure of the kidneys or of the heart, and that failure of the kidneys results from "interference with their supply of nervous energy . . . To secure activity of the kidneys or strengthen the heart, the Chiropractor adjusts the spine to remove pressure from nerves leading to those organs." It will come as a surprise to students of cardiology to learn that "hypertrophy will ensure good circulation." Most will no doubt continue to believe with Dr. Samuel Levine that "The larger the heart, other things being equal, the poorer the prognosis."(1)

If chiropractors and other cultists would confine their activities to comparatively trivial conditions, they would do little harm. When they undertake to treat such serious diseases as diabetes, congestive heart failure and nephritis by their hocus-pocus methods, however, they are courting danger—not to themselves, but to the lives of their patients.

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1. Levine, S. A.: Clinical Heart Disease, ed. 2, Philadelphia, W. B. Saunders Co., 1940, p. 294.

## "SANATORIUM" BECOMES "McCAIN"

On January 1, 1948, the name of the post office of our central State Sanatorium for Tuberculosis will be changed from "Sanatorium" to "McCain." The change, of course, is made as a tribute to the late Dr. Paul McCain, beloved leader in North Carolina's fight against tuberculosis. It is hard to conceive of a more appropriate way to honor his memory. The tribute will be appreciated by the whole state of North Carolina; but those who will rejoice most are his former patients in the State Sanatorium and the members of the Medical Society of the State of North Carolina.

* * * *

## OUR PUBLISHERS HAVE A NEW NAME

Since the change on the masthead of the NORTH CAROLINA MEDICAL JOURNAL from the Penry-Aitchison Printing Company to the Carmichael Printing Company may be noticed by some of our readers, a word of explanation is in order. The Penry-Aitchison Printing Company was founded in 1927 by Messrs. W. M. Penry and Harry F. Aitchison. Mr. Penry retired several years ago and Mr. Aitchison died in 1945(1). After Mr. Aitchison's death, Mr. Robert C. Carmichael, who had been associated with the company for twelve years, became its manager, and later bought the entire stock of the company. On December 1 of this year the name of the firm was changed from the Penry-Aitchison Printing Company to the Carmichael Printing Company.

Mr. Carmichael is acquainted with all the problems incident to publishing the NORTH CAROLINA MEDICAL JOURNAL, and its subscribers may rest assured that there will be no letdown in the high standards of printing that have been maintained from its beginning.

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1. Harry Aitchison, Editorial, North Carolina M. J. 6:451 (Oct.) 1945.

## NOTICE

**Only a very few copies of last month's issue of the NORTH CAROLINA MEDICAL JOURNAL—the McCain memorial issue—are left on hand. Already the editorial office has had many more requests for this issue than it can supply. Anyone who still has a copy of this issue and does not wish to save it is urgently requested to mail it to the NORTH CAROLINA MEDICAL JOURNAL, 300 South Hawthorne Road, Winston-Salem 7. Fifteen cents will be paid for each copy received in good condition.**

# Clinicopathologic Conference

## BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

A 38-year-old white housewife was admitted to the hospital because of abdominal swelling of two months' duration.

The patient was essentially well until one year before entry, when she began to experience progressive nervousness, anorexia, and weakness. For eight months preceding entry she had noted tenderness and dull aching in the right upper quadrant, with an associated localized swelling in that area subcostally. Symptoms were not related to food, position, or exertion, and were promptly relieved by hot applications. Her physician made a tentative diagnosis of gallbladder disease.

Four months previous to admission, a bluish-gray, "metallic" rash developed on the patient's skin. It was characterized by marked burning and itching, and was termed "psoriatic" by her physician. She was treated with capsules, calamine lotion, and intravenous injections of a yellowish fluid. One week after the first injection and two days after the second, generalized abdominal swelling and ankle edema began. At this time the patient first noted hemorrhoids, and she stated that from this time on she occasionally would expectorate blood-tinged sputum.

Admission to a hospital was advised, and she was seen at two hospitals, where she received diuretics without effect, and intramuscular medications. Following gallbladder drainage studies, she was told that she had gallbladder and liver disease. Three paracenteses done while she was hospitalized were productive of 5 ounces, 2 quarts, and 3¾ quarts respectively. Three subsequent paracenteses were done by her physician, and were productive of an average volume of 2 quarts. Following the last paracentesis, seven days before entry, the patient noted edema of the perineum and of the entire lower extremities, especially the right. The patient stated that she had gained 22 pounds in the two months preceding entry. Her appetite had improved in the last two weeks, following treatment by an "herb doctor."

The family history revealed that two sisters had died with swollen abdomens and "a somewhat similar disorder" at the ages of 12 and 16 years.

The past history was essentially negative except for a poor dietary intake for ten years and an alcoholic intake of two to three bottles of beer a day and a pint of liquor a week for a similar period. The patient had had a dilatation and curettage and a salpingectomy in 1932.

Physical examination revealed a fairly well developed, poorly nourished white female, appearing about her stated age and in no acute distress. The skin had a bluish-gray, metallic hue, and numerous acneform lesions were scattered over the face and shoulders. No spider angiomas were observed. Examination of the lymph nodes, head, eyes, ears, nose, and throat was negative. The tongue was somewhat smooth and reddened. Examination of the chest showed the lungs and the heart normal; the diaphragms were high, with limited excursions. The abdomen was quite distended, and palpation revealed a fluid wave and shifting dullness. The liver was thought to be palpable 2 to 3 fingers' breadth below the costal border. There was slight tenderness in the right upper quadrant and decided tenderness in the right lower quadrant around a healing paracentesis wound. There was marked pitting edema in the right lower quadrant and right flank. The perineum was quite edematous, and there was pitting edema of both lower extremities, more marked on the right. Neurologic examination was negative. The pulse was 100, temperature 99.2 F., respiration 28, blood pressure 118 systolic, 70 diastolic.

The blood count on admission showed 6,300,000 red blood cells, 13.8 Gm. of hemoglobin, and a color index of 0.68. There were 10,550 white blood cells, with a normal differential. Urinalysis was negative, and the Kahn test was negative. The icterus index was 15 units. Total serum proteins were 5.4 mg. per 100 cc., with an albumin-globulin ratio of 1.7. The serum bilirubin was 0.9 mg. per 100 cc. The bromsulfalein test of liver function showed 100 per cent retention in thirty minutes. A glucose tolerance test revealed a fasting blood sugar of 98 mg. per 100 cc.; at thirty minutes the blood sugar was 120 mg. per 100 cc., at one hour 147 mg., at two hours 215 mg., at three hours 176 mg., at four hours 133 mg., and at five hours 82 mg.

The patient was placed on a high-protein, low-fat diet, containing a moderate amount of carbohydrate and at least 3,000 calories daily. Supplemental vitamins and crude liver extract were added. A course of penicillin therapy was instituted in an effort to clear up the infection in the abdominal wall of the right lower quadrant. The patient continued to complain of pain in this region. Diuretics had little effect on the edema. Tube feedings were instituted on the tenth hospital day because of the patient's inability to ingest the prescribed diet. On the sixteenth day, 1000 cc. of plasma was given without noticeable result. On the twentieth day, paracentesis was done and 4100 cc. of straw-colored fluid removed. The ascitic fluid contained 1.9 Gm. of protein per 100 cc., with an albumin-globulin ratio of 1.7. Five hundred cubic centimeters of plasma was given on the twenty-second hospital day. On the twenty-fourth day, the nonprotein nitrogen was 40 mg. per 100 cc. and the total serum proteins were 5.7 Gm. with an albumin-globulin ratio of 1. Shortly thereafter the patient's temperature began to rise and she became irrational and then comatose. She expired on the twenty-sixth hospital day.

### *Discussion*

DR. FREDERICK R. TAYLOR: A 38-year-old white housewife entered the hospital with the chief complaint of abdominal swelling. A year before, she had become nervous and weak, and had lost her appetite. Four months later, tenderness, dull aching, and localized swelling developed in the right upper quadrant of her abdomen; these symptoms were unrelated to food, position or exertion, and were promptly relieved by hot applications. Her physician made a tentative diagnosis of gallbladder disease. He may have actually felt a mass highly suggestive of an enlarged gallbladder—we do not know. The condition was obviously chronic rather than acute; there is nothing suggestive of biliary colic. The lack of relation to food is suggestive of liver disease unassociated with gallbladder disease.

Four months after these symptoms began, and four months before admission, a bluish-gray, "metallic" rash developed. This was associated with marked burning and itching, and was called "psoriatic" by her physician. He gave her medicine, including a yellowish liquid intravenously. Nothing is said about serologic tests at this time. Was "psoriatic" a euphemism for "syphilitic," and was the yellowish liquid neoarsphenamine? If so, in the presence of a non-syphilitic liver disease, it might be expected to make her much worse through its hepatotoxic effect. It is possible, of course, that the liquid might have been protein hydrolysate or some such preparation given for liver dysfunction. It would be helpful to know the amount given and the method of injection.

Two injections apparently were given five days apart. Two days after the second one, the patient noted generalized abdominal swelling, ankle edema, hemorrhoids, and *expectoration* of blood-tinged sputum. Note that it is *not* stated that she *coughed* up blood. This picture suggests a blocking of the portal and systemic circulations, which would produce ascites, edema of the lower part of the body, and varicosities in the rectum and esophagus. The patient failed to improve in two hospitals, but after gallbladder drainage studies she was told that she had gallbladder and liver disease. There is no mention of a cholecystogram. Three abdominal tappings showed obvious ascites, and extensive edema of the lower part of her body was developing rapidly. Her gain of 22 pounds in two months must, I think, be attributed chiefly, if not solely, to fluid retention.

Now we encounter either a huge red herring or a most significant item, for we learn that two sisters had died with swollen abdomens and somewhat similar conditions at the ages of 12 and 16 years. Automatically, we think of certain familial disorders of lipid metabolism, especially Gaucher's disease. This patient, and even her younger sisters, seem too old for Niemann-Pick's disease (sphingomyelinosis) or for von Gierke's glycogen disease. In Gaucher's disease, however, the spleen is huge: and it is not even said to be enlarged in this patient. The young sisters may have had it—it occurs especially in girls and tends to affect siblings—, but in our patient the onset at the age of 37 with death within a year, as well as the absence of splenic enlargement, would seem to negate that definitely chronic condition.

Two things in our patient's past history now demand our attention. For ten years she had had a poor diet and had taken fourteen to twenty-one bottles of beer and a pint of liquor a week. This adds up to a considerable amount of alcohol over a rather long period of time. We cannot estimate the quantity exactly, as all beers and liquors are not of the same alcohol content. Perhaps we would not be far wrong in estimating an average intake of more than 4½ ounces a day. This might well be an important factor in producing liver damage.

The salpingectomy in 1932 strongly suggests, though it does not prove, a gonococcal infection. If she had that, she might have had syphilis too. We have no history of it, however, and we learn later that the Kahn test was negative. Since there is no history of antisyphilitic treatment, unless the two intravenous injections mentioned above were neoarsphenamine, and since only two doses would seem quite inadequate to reverse the blood serology, syphilis seems very unlikely.

We are told that her skin had a bluish-gray, metallic *hue*. Nothing is said about any bluish-gray rash, such as that described by her physician. One thinks of argyria, but there is no story of prolonged ingestion of silver. In view of the absence of a huge liver or any story of a growing mole or retinal trouble, hepatic melanoma seems unlikely. Ordinary portal cirrhosis is often associated with a bluish-gray tinge of the skin, perhaps due to an excess of melanin which can occur when there is a depletion of vitamin C.

The appearance of the tongue suggests some deficiency of the B complex of vitamins. Little else was found in the physical examination except gross ascites and edema of the entire lower part of the body, with a questionably palpable liver, slight tenderness in the right upper quadrant of the abdomen, and marked tenderness around a healing tap wound in the right lower quadrant, later described as showing infection in the abdominal wall. The edema was greater on the right side than on the left.

Her lungs are described as clear in the physical examination. With the history of bloody expectoration, one would be glad to have the x-ray findings in the chest, too, but these are not vouchsafed unto us. The elevation of temperature to 99.2 F. seems insignificant, and may be explained by the infection of the abdominal wall.

The rather high red cell count may be attributed to loss of fluid from the blood vessels into the abdominal cavity and tissues. The slight elevation of the white cell count could easily be due to the abdominal wall infection. The icterus index (15 units) was definitely elevated, the normal being 4 to 6 units; from 7 to 15 units is considered the zone of latent jaundice, as clinical jaundice rarely appears until the index rises above this zone. We have no history of jaundice in this patient. The total serum proteins were somewhat below normal, but one would expect some protein to escape into the ascitic and edema fluid. The albumin-globulin ratio was normal. The serum bilirubin (0.9 mg. per 100 cc.) was high, the normal range being from 0.1 to 0.25 mg. The bromsulfalein test showed serious liver damage, as normally there should be little or no retention in the serum twenty minutes after injection. The glucose tolerance also was impaired, for the curve should return to a normal fasting level (80 to 120 mg. per 100 cc.) in two hours.

Our patient was placed on a diet suitable for hepatic failure, with extra vitamins and crude liver extract. She died in twenty days, however, with a terminal rise in temperature —perhaps an agonal invasion of the blood stream from the infected paracentesis wound.

Obviously, this patient had fatal liver disease. Whether the gallbladder was diseased or not, I do not know; her own physician's findings would suggest that it was. She was entering the so-called cancer age. Primary cancer of the liver is rather rare, secondary hepatic involvement common. We have no hint of any other malignant focus, unless it might be in the gallbladder. Primary or secondary, I do not recall a fatal cancer of the liver occurring without clinical jaundice.

Simple chronic passive congestion is excluded, for it would have caused a cardiac death with dyspnea and pulmonary edema. Syphilis has been excluded, so far as possible. We have no evidence of tuberculosis anywhere. The absence of jaundice would seem to exclude acute viral or leptospiral hepatitis as the original cause of the trouble, as it would any chemical poisons causing acute yellow atrophy. Since we do not know what the two intravenous injections were, we cannot say what part, if any, they played in the picture. Certainly they did not initiate the trouble. The constitutional symptoms of liver abscess—chills and fever—are lacking. Biliary cirrhosis would not be likely to cause such a degree of edema, ascites, hemorrhoids, and presumably esophageal varices. There is nothing to suggest echinococcus cyst of the liver. Primary thrombosis of the inferior vena cava or of the portal vein is excluded by the duration of the disease.

As we have no evidence of splenomegaly, the diseases in which that is an essential feature are excluded. While enlargement of the spleen occurs in over half the cases of Laennec's cirrhosis, it is not essential to the picture. The patient's survival for about eight months after the appearance of ascites is in accord with clinical experience in this disease. Patek⁽¹⁾ says that when clinical signs of liver failure appear, the outlook is grave. He cites an analysis of 386 such cases, in which 57 per cent of the patients survived six months after the onset of ascites, 39 per cent one year, and 21 per cent two years.

One other condition remains to be considered—Chiari's disease. This is a syndrome due to a special type of occlusion of the ostia of the hepatic veins, described by the German pathologist, Hans Chiari, in 1899. The fundamental etiology is unknown. The acute type, fatal in a few days, is easily excluded in this case. The subacute type may last as long as six months, and is usually diagnosed clinically as a rapidly developing cirrhosis. There is no prolonged chronic type of Chiari's disease, so far as I know.

We do not really know how long our patient's liver had been damaged, for profound damage may exist without symptoms. She did, however, have symptoms for a year—rather long for even the subacute type of Chiari's disease.

Because of the history of an inadequate diet and steady drinking for ten years, plus the clinical picture, I shall venture the opinion that this patient had a very common disease, Laennec's cirrhosis of the liver, or portal cirrhosis. This seems by far the most likely diagnosis, with only an *exceedingly* remote chance that we may be dealing with an unusually prolonged subacute type of Chiari's disease.

### *Dr. Taylor's Diagnosis*

Laennec's cirrhosis

### *Anatomic Discussion*

DR. LADD W. HAMRICK, JR.: The striking finding at postmortem examination was the slightly enlarged liver, which was deep red in color. The outer surface was smooth. When the inferior vena cava was opened, the openings of the hepatic veins were found to be occluded by firm, red-yellow thromboses. Sections through the liver tissue showed a deep red, congested appearance, alternating with areas of yellow discoloration. The entire venous system was filled with blood clot.

The microscopic sections showed the sinuses congested with red blood cells and the liver parenchymal cells atrophied by pressure. The hepatic veins were occluded by thrombi showing various degrees of organization.

The peritoneal cavity contained 1150 cc. of clear, amber fluid with a specific gravity of 1.010. All the tissues of the body showed evidence of a slight icteric tint. The lower lobes of both lungs presented mottled patchy areas of consolidation.

### *Anatomic Diagnoses*

1. *Thromboses of the hepatic veins with marked congestion and necrosis of the liver tissue (Chiari's disease)*
2. Ascites
3. Jaundice
4. Bronchopneumonia, right middle and lower lobes, left lower lobe

**The limitations of scientific methods.**—Scientific methods employed by internists have been instrumental in the early recognition and satisfactory control of a great number of clinical conditions. They have been helpful in establishing greater freedom from infection, better nutrition and better health than has been known before. To all of us who use them, however, their limitations are obtrusive. In spite of their increasing complexity and scientific exactitude they may fail to acquaint us with the real problems of the man or woman who is sick. Many times indeed the routine questioning and testing become so elaborate and time-consuming that there is little opportunity for the patient to give or for the internist to hear an unimpeded and uninterrupted account of the illness. It appears that often in the complicated analysis the true goal may be lost . . . There is also a question whether anxiety to recognize early organic disease may make one oblivious to the danger of producing invalidism and neurosis, whether chagrin over failure to hear a low-pitched murmur or to feel a palpable spleen is matched by the discomfiture of missing completely the personality of the patient, his hopes and fears, his hates and loves, his obsessions and frustrations, or the indelible imprint which his disease has made on his attitudes and motivations.—David P. Barr: The Responsibilities of the Internist, Ann. Int. Med. 27:196 (Aug.) 1947.

1. Patek, A. J., Jr., in Cecil, R. L.: Textbook of Medicine, ed. 7, Philadelphia, W. B. Saunders Co., 1947, pp. 863-864.

# MEDICOLEGAL ABSTRACT

J. F. OWEN, M.D., LL.B.
RALEIGH

LIABILITY FOR PHYSICIANS' SERVICES: *One who merely calls a physician to render services to another is not liable therefor in the absence of an express agreement, unless he is bound to furnish such services to the patient.*

This is a case in which a physician responded to an emergency call at the scene of an automobile accident. Upon reaching the place where the summons originated, the doctor was urged by the daughter of the injured person to "do everything you can under the sun to see this man is taken care of." She further stated, "I want my father taken care of, and give him the best care you can give him, and whatever the charges are I will pay for it." The doctor called an ambulance, in which the victim was taken to a hospital. He treated him there until the next day, when the patient was discharged. He died from the effects of the injuries a few days later.

The doctor made his charge for services to the deceased man's estate, and employed a lawyer to help collect the bill. He received no payment, however. An effort was also made to collect from the widow, but this too was unsuccessful. About a year and a half after the accident the physician entered suit against the daughter referred to above, alleging that she had become liable for his services by her promise, made at the time of the accident, to pay the charges.

When this case came up for a hearing before a jury in municipal court, a verdict was rendered for the defendant daughter. The physician who was the plaintiff excepted and appealed to the Supreme Court.

The higher court ruled that the doctor, in seeking payment from the estate, elected to consider the promise made by the daughter a collateral undertaking. Thus it was placed within the statute of frauds, and would have to be in writing in order to be enforceable. Had he sought payment originally from the promisor, her promise, "I will pay for it," would have been binding and enforceable, although made orally. The Supreme Court, in explanation of its ruling, stated that when a person assumes responsibility for the payment of a debt in the event of failure by the principal to pay, the contract comes within the old statutes of frauds, and must be in writing before it is enforceable. The error made by the doctor was in attempting to collect from other sources first. This showed, *prima facie*, that he considered the promise made by the defendant as a collateral or secondary obligation.

Usually, and perhaps unfortunately, financial arrangements are not made between a physician and patient, as there is an implied contract in force just as soon as the doctor accepts the case. The main factor in an implied contract of this kind, on the part of the patient, is that he will cooperate and will pay a reasonable fee for services rendered. The physician, for his part, agrees to be diligent, to exercise the required skill, knowledge, and judgment, and to remain with the case until his services are no longer needed, or until he is discharged by the patient. Unless one who calls a physician to render services for another is legally bound to furnish such services, he is not liable in the absence of an express contract to that effect.

The Supreme Court was in agreement with the court below and affirmed the judgment found for the defendant daughter.

(Supreme Court of Vermont, May 5, 1936. Vol. 184, Atlantic 689.)

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# TUBERCULOSIS ABSTRACTS

## *A Review for Physicians*

Issued Monthly by the National Tuberculosis Association

Vol. XX December, 1947 No. 12

### BCG VACCINATION

THERE was a time when even to mention the use of BCG vaccination as a protection against tuberculosis provoked violent controversy. This procedure, introduced in France after the first World War, employs as a vaccine an attenuated strain of the tubercle bacillus known as Bacillus Calmette Guerin to build up resistance to more virulent organisms of the same species. The lack of controls and of adequate statistical evidence in the early work in Europe made American students of tuberculosis understandably cautious in their acceptance of BCG. Moreover, there was ample evidence that the methods of control already in use in the United States were doing more to control tuberculosis than even its most ardent proponents could claim for BCG vaccination.

That BCG is again being discussed as a practical public health measure is due largely to the recent publication of four experimental studies which seem to show that BCG may have real value under certain circumstances. Aronson and Palmer have reported favorably on six years' experience with a group of North American Indians who were vaccinated with BCG.

The experience of Ferguson who used BCG vaccine with the nurses and attendants in eight general hospitals and tuberculosis sanatoriums in the province of Saskatchewan, Canada, seems to show that BCG immunization is effective in affording a measure of protection to groups subjected to special hazard.

Holm has reported beneficial results from the use of BCG in Denmark where it is employed extensively with tuberculin negative individuals to prevent dangerous primary infections. During the course of immunization, the tuberculin reaction usually changes from negative to positive.

In contrast to these findings, Levine and Sackett, who studied carefully the results of vaccinating several hundred New York City infants, concluded that "as a public health measure the routine vaccination with BCG of children from tuberculous homes is probably of less advantage than removing the tuberculous case from the home."

As a result of accumulated new evidence the Tuberculosis Control Division of the U. S. Public Health Service invited leaders in tuberculosis work to a conference on BCG vaccination, held in Washington, D. C., on September 7, 1946. The purpose was to evaluate the reported studies with BCG so as to determine what use, if any, could be made of this procedure and what conditions would be most favorable for its employment.

Those attending the conference were: Dr. J. Burns Amberson, College of Physicians and Surgeons, Columbia University, New York; Dr. Joseph D. Aronson, Henry Phipps Institute, Philadelphia; Dr. Howard W. Bosworth, Barlow Sanatorium, Los Angeles; Dr. Charles A. Doan, College of Medicine, Ohio State University, Columbus, Ohio; Dr. Johannes Holm, State Serum Institute, Copenhagen, Denmark; Dr. Esmond R. Long, Henry Phipps Institute, Philadelphia; Dr. Jay A. Myers, University of Minnesota, Minneapolis; Dr. David T. Smith, Duke University, Durham, N. C.; Dr. Henry Stuart Willis, North Carolina Sanatorium for the Treatment of Tuberculosis (formerly of William H. Maybury Sanatorium, Northville, Mich,); and Dr. I. C. Yuan, National Institute of Health, Nanking, China.

The Public Health Service was represented by Doctors Herman E. Hilleboe and Carroll E. Palmer of the Tuberculosis Control Division, and Dr. Milton V. Veldee, Biologics Control Laboratory of the National Institute of Health, Washington, D. C.

During the conference a careful review of all investigations with BCG was made and there was a general discussion of the entire problem of BCG vaccination. It was agreed that there have been no proved cases of progressive tuberculosis from BCG vaccination. It was concluded that BCG vaccination appears to confer increased resistance to tuberculosis for the relatively short period of time covered in the studies.

The following conclusions and recommendations were made by the conference and the policy outlined was later approved by Surgeon General Thomas Parran for the U.S.P.H.S.:

1. BCG vaccine should not be made commercially available at present.

2. From studies presented at the conference, it appears that BCG vaccination confers increased resistance to tuberculosis for the limited period of time covered in these studies.

3. Medical literature fails to reveal any proved cases of progressive disease as a result of BCG vaccination.

4. BCG vaccination (properly administered) can be done without causing severe local reactions.

5. The intracutaneous method of vaccination is recommended for use at present.

6. In the studies presented, BCG vaccination converted a large percentage of nonreactors (to the tuberculin test) into reactors.

7. Need for revaccination and time interval between vaccination require further study.

8. It was recommended that a single laboratory be established by the Tuberculosis Control Division to produce BCG vaccine for the whole country for use in research programs proposed at this conference. (The daily press has since reported that the designated laboratory is that of a new tuberculosis research hospital to be constructed by the University of Illinois professional schools, in Chicago.)

9. Extensive investigations should be carried on cooperatively with recognized research groups throughout the country during the coming years, especially in population groups highly exposed to tuberculous infection.

10. It was recommended that the Tuberculosis Control Division set up a controlled study in a community containing 100,000 or more people, to determine immediate and long-range results.

11. Further research is strongly recommended to determine the efficiency of the vaccination and also to attempt to develop a vaccine composed of dead bacilli. It was recommended that methods be developed to standardize techniques of preparation of a potent and stable vaccine for use in the United States and if possible throughout the world.

The way has now been cleared for an extensive study of BCG in this country. With special groups such as the North American Indians, inmates and employees of mental hospitals and certain racial and professional groups where the morbidity and mortality from tuberculosis are known to be high, there now seems justification for a trial of BCG. It is not expected to take the place of known and proved methods for controlling tuberculosis—but BCG may well be an added weapon against an old enemy.

**Suggested Reading:**

1. Aronson, Joseph D. and Palmer, Carroll E., Pub. Health Rep., June 7, 1946, 61:802.
2. Ferguson, R. G., Can. Jour. Pub. Health, Nov., 1946, 37:435; and Amer. Rev. Tuber., Oct.-Nov., 1946, 54:325.
3. Holm, Johannes, Pub. Health Rep., Sept. 6, 1946, 61:1298.
4. Levine, Milton I. and Sackett, Margaret F., Am. Rev. Tuber. June, 1946, 53:517.
5. Hilleboe, Herman E., Amer. Rev. Tuberc., March, 1947, 55:294.
6. Preas, Sally, Milbank Mem. Fund. Quar., April, 1947, 25:215.
7. Editorial, Amer. Jour. Pub. Health, March, 1947, 37:307.
8. Editorial, J.A.M.A., Nov. 9, 1946, 132:581.

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**Tuberculosis is so deeply a personal disease** that news of its tragic onset or advance can be more calmly accepted when the source of the news is the family doctor and not a stranger from a distant agency.—Ed., Pub. Health Rep., Dec. 6, 1946.

# BULLETIN BOARD

## PRESIDENT'S MESSAGE

My greetings to all the members of the medical profession of North Carolina. We are all still stunned by the sudden and tragic death of our friend and president, Dr. Frank Sharpe. He has been an untiring worker for our State Medical Society, and had sacrificed much of his valuable time and given freely of his strength and energy in performing the duties of his office as president. His friends and patients paid him a wonderful tribute at the First Presbyterian Church in Greensboro on Sunday, November 23, under most adverse weather conditions.

Since the duties and responsibilities of his office have fallen upon my shoulders, I hope that you will give me your wholehearted cooperation in carrying on the policies and program Dr. Sharpe had so ably initiated; and that you will acquaint yourselves with the problems your officers and executive committee have to deal with. I shall bring some of the problems to your attention from time to time through the columns of the NORTH CAROLINA MEDICAL JOURNAL; and I hope that more of you will attend the business sessions of the State Medical Society, where we may have the benefit of your counsel and advice, and where you may help direct the policies of our state organization.

JAMES F. ROBERTSON, M.D.
Wilmington

## NEWS NOTES FROM THE NORTH CAROLINA TUBERCULOSIS ASSOCIATION

A meeting of the Postgraduate Medical Education Committee, Region III, of the American Trudeau Society was held in Durham on November 18. Members of this committee from North Carolina are Dr. H. Stuart Willis, chairman; Dr. Howard Bradshaw, co-chairman; Dr. Reece Berryhill, Dr. David T. Smith, and Frank W. Webster.

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Dr. Kendall Emerson, managing director of the National Tuberculosis Association since 1928, has resigned to retire to private life. His resignation becomes effective on January 1. He will be succeeded by Dr. James E. Perkins, a native of St. Paul, Minnesota.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF MEDICINE

The first two postgraduate medical courses sponsored by the University School of Medicine and the Extension Division will be held at Lumberton beginning January 14 and at Salisbury beginning January 15, with the Medical Societies of Robeson and Rowan Counties as co-sponsors. The programs for the two courses are as follows:

**Lumberton**

January 14: Diabetes—Dr. Howard F. Root, Associate in Medicine, Harvard Medical School; New England Deaconness Hospital.

January 21: Cancer of the Gastrointestinal Tract from the Standpoint of the General Practitioner —Dr. I. A. Bigger, Professor of Surgery, Medical College of Virginia (Sponsored by the North Carolina Chapter of the American Cancer Society).

January 28: Hypertension and Hypertensive Heart Disease from the Standpoint of the General Practitioner—Dr. William D. Stroud, Professor of Cardiology, University of Pennsylvania Graduate School of Medicine.

February 4: The Causes and Management of Prolonged Labor—Dr. Edward A. Schumann, Philadelphia.

February 11: Orthopedic Problems in General Practice—Dr. A. R. Shands, Alfred I. duPont Institute of Nemours Foundation; Visiting Professor of Orthopedic Surgery, University of Pennsylvania School of Medicine.

February 18: Diagnosis and Treatment of Common Diseases of the Gastrointestinal Tract—Dr. George B. Eusterman, The Mayo Clinic.

**Salisbury**

January 15: Diabetes—Dr. Howard F. Root, Associate in Medicine, Harvard Medical School; New England Deaconness Hospital.

January 22: Cancer of the Gastrointestinal Tract from the Standpoint of the General Practitioner —Dr. I. A. Bigger, Professor of Surgery, Medical College of Virginia (sponsored by the North Carolina Chapter of the American Cancer Society).

January 29: Hypertension and Hypertensive Heart Disease from the Standpoint of the General Practitioner—Dr. J. Edwin Wood, Jr., Professor of the Practice of Medicine, University of Virginia School of Medicine.

February 5: Obstetrical Anesthesia and Analgesia —Dr. Edward A. Schumann, Philadelphia.

February 12: Newer Developments in the Diagnosis and Treatment of Blood Dyscrasias—Dr. Roy R. Kracke, Dean of the University of Alabama School of Medicine.

February 19: Office Dermatology—Dr. A. Benson Cannon, Associate Clinical Professor of Dermatology, Columbia University College of Physicians and Surgeons.

February 26: Endocrinology from the Standpoint of the General Practitioner—Dr. Emil Novak, Associate Professor of Obstetrics, University of Maryland School of Medicine; Assistant Professor of Gynecology, the Johns Hopkins University School of Medicine.

Programs for the courses at Raleigh and Greensboro, which will begin the first of March, will be announced later.

## NEWS NOTES FROM THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF PUBLIC HEALTH

Dr. E. G. McGavran, dean of the School of Public Health, and Miss Margaret Blee, associate professor of public health nursing, attended the meetings of the North Carolina Public Health Association, held in Charlotte on November 4. Dr. McGavran presented a paper before the general session on "The Essentials of a Statewide Communicable Disease Control Program"; Miss Blee reported on the International Congress of Nurses which was held in Atlantic City last May.

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The Southern Conference on Nutrition and Public Health, under the auspices of the School of Public Health of the University of North Carolina, was held in the Health Education Workshop on November 14 and 15. The program for the conference was arranged by Dr. A. H. Bryan, professor of nutrition, and his staff. Agriculture, community nutrition, and public health nutrition were the main topics under discussion. The purpose of the conference was to bring together experts who could contribute from a whole range of nutritional interests—that is, the soil-plant-animal-human relationships. Those attending the conference included representatives from North Carolina, Louisiana, Florida, South Carolina, Tennessee, Alabama, Illinois, and Canada.

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On November 24 and 25, Dr. E. G. McGavran, dean of the School of Public Health, attended the meetings of the Southern Medical Association in Baltimore. While there he presented the paper, "Practical Consideration of Tropical Diseases Important to the General Practitioner and Health Officer."

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Dr. Clair E. Turner, health education consultant with the National Foundation for Infantile Paralysis, visited the School of Public Health on Friday, December 5, 1947.

## NORTH CAROLINA HEALTH EDUCATION CONFERENCE

A meeting of the North Carolina Health Education Conference, sponsored by the Council on Public Education of the North Carolina Hospital Association, the North Carolina Good Health Association, and the Hospital Saving Association, was held November 12 and 13 in Charlotte. The conference was called "to facilitate a close cooperation in planning and service among the many organizations interested in the welfare and health of the people."

The following members were elected to serve on an eleven-man council, to be known as the "North Carolina Health Agencies Council": J. T. Barnes, executive secretary, N. C. Medical Society; H. C. Crawford, executive vice president, Hospital Saving Association; Clyde Erwin, Superintendent of Public Instruction; Reid T. Holmes, administrator of the North Carolina Baptist Hospital; Mrs. George Marshall, State Commander, N. C. Division, American Cancer Society; Dr. E. G. McGavran, dean, School of Public Health, University of North Carolina; Marshall I. Pickens, the Duke Endowment; Miss Flora Wakefield, supervising nurse of the Wake County Health Department; Frank W. Webster, executive secretary, North Carolina Tuberculosis Association; and Dr. Ellen Winston, Superintendent of Public Welfare.

## STATE BOARD OF MEDICAL EXAMINERS

The Board of Medical Examiners of the State of North Carolina will meet on January 12, 1948, at the Carolina Hotel, Pinehurst, for the purpose of interviewing applicants for licensure by endorsement.

## FOURTH DISTRICT MEDICAL SOCIETY

Dr. Clarence Gardner, associate professor of surgery at the Duke University School of Medicine, was guest speaker at the fall meeting of the Fourth District Medical Society, held in Wilson on November 13. His subject was vagotomy.

Dr. Herman F. Easom of Wilson was elected president of the Society, succeeding Dr. Claiborne Smith of Rocky Mount. Dr. Howitt Foster of Norlina was elected vice president and Dr. Robert M. Whitley of Rocky Mount was re-elected secretary and treasurer. Dr. Newsom P. Battle of Rocky Mount is councilor of the Fourth District. The next meeting will be held in Rocky Mount.

## SIXTH DISTRICT MEDICAL SOCIETY

The Sixth District Medical Society met at Creedmoor (Camp Butner) on November 12. The scientific program at the afternoon meeting was given by Dr. Earl W. Brian of Raleigh, Dr. J. C. Trent of Durham, and Dr. H. B. Kernodle of Burlington. Dr. John A. Ferrell, director of the North Carolina Medical Care Commission, Dr. Frank Sharpe, Dr. Roscoe McMillan, and Dr. Millard D. Hill, councilor of the Sixth District, also spoke briefly. Dinner was served at the hospital, and the after-dinner program was in charge of the hospital officials.

Officers elected for the coming year were Dr. Earl W. Brian, president, succeeding Dr. Joseph W. Thompson of Creedmoor; Dr. H. B. Kernodle, vice president, succeeding Dr. W. W. Noel of Henderson; and Dr. J. C. Trent, secretary-treasurer, succeeding Dr. P. Y. Greene of Burlington.

## CATAWBA VALLEY MEDICAL SOCIETY

Dr. George T. Harrell, professor of medicine at the Bowman Gray School of Medicine, spoke on the subject of "Rickettsial Diseases" at a dinner meeting of the Catawba Valley Medical Society, held in Lenoir on December 9.

## EDGECOMBE-NASH COUNTIES MEDICAL SOCIETY

The November meeting of the Edgecombe-Nash Counties Medical Society was held in Rocky Mount on November 19. Guest speakers were Drs. David Cayer and George Harrell of Winston-Salem. Dr. Cayer spoke on "Present Concepts in the Management of Liver Disease," and Dr. Harrell on "Medical Conditions in Europe."

The Society has appointed a permanent blood-banking service committee, consisting of Dr. Kenneth Wright, chairman; Dr. Adam Thorp; and Dr. K. D. Weeks. Dr. Thomas Holt has been elected a member of the Society.

## FORSYTH COUNTY MEDICAL SOCIETY

The Forsyth County Medical Society held a dinner meeting in Winston-Salem on November 11. Dr. Clarence E. Gardner of Durham spoke on "The Surgical Treatment of Peptic Ulcer."

## NEWS NOTES

Dr. Pierre P. Poole of Cross Anchor, South Carolina, has joined Dr. W. S. Wall of Rocky Mount in the practice of medicine.

## CORRECTIONS FOR THE ROSTER

The following additional corrections have been received for the roster and alphabetical list of fellows published in the August issue:

Dr. D. Waldo Holt, Greensboro—Specialty should be I rather than GP.

Dr. Walter T. Tice, High Point—Specialty should be I rather than GP.

## GRASS ROOTS CONFERENCE OF COUNTY MEDICAL SOCIETY OFFICERS

The Grass Roots Conference of the National Conference of County Medical Society Officers will be held in Cleveland, Ohio, on Tuesday evening, January 6, at the Statler Hotel, from 7:30 to 11 p.m. The purpose of this conference is "to develop a working partnership between the American Medical Association and every physician." Subjects which will be discussed are "The General Practitioner—How to Create More of Him for the Future Need of the Country"; "Upholding the Prestige of the General Practitioner"; and "The General Practitioner and Community Leadership." Officers and representatives of county medical societies will participate in the program.

Hotel reservations may be secured by writing to Dr. David Chambers, Chairman, Hotel Committee (A.M.A.), 511 Terminal Tower, Cleveland 13, Ohio.

## EIGHTH ANNUAL CONGRESS ON INDUSTRIAL HEALTH

The Council on Industrial Health will hold its Eighth Annual Congress on Industrial Health in the Cleveland Auditorium, Cleveland, on January 5 and 6, 1948. These dates immediately precede the Interim Session of the American Medical Association, which will be held in the Auditorium on January 7 and 8. General practitioners supply a large part of the medical services which workers receive through industry, and they are cordially invited to attend these industrial health sessions.

## AMERICAN COLLEGE OF SURGEONS

Dr. Arthur W. Allen, president of the American College of Surgeons, announces the scheduling of six sectional meetings in 1948, for fellows of the College, the medical profession at large, and hospital personnel. Each meeting will be two days in length and will include conferences for hospital personnel as well as sessions for the medical profession. One of the six meetings will be held in Atlanta, January 26 and 27, at the Ansley Hotel.

## THE SOUTHEASTERN SURGICAL CONGRESS

The Sixteenth Annual Assembly of the Southeastern Surgical Congress will be held in Hollywood, Florida, Hollywood Beach Hotel, April 5-8, 1948. Among the speakers who will appear on the program are Dr. Julian A. Moore of Asheville, Dr. James F. Robertson of Wilmington, and Dr. R. A. Ross of Durham.

## MIDWINTER SEMINAR IN OTOLARYNGOLOGY AND OPHTHALMOLOGY

The University of Florida Midwinter Seminar in Otolaryngology and Ophthalmology will be held at the Flamingo Hotel in Miami Beach, January 12-17, 1948. The lectures in otolaryngology will be presented on January 12, 13, and 14, and those in ophthalmology on January 15, 16, and 17. The registration fee is $25.

The lecturers for the courses in otolaryngology include Drs. Lawrence R. Boies, Minneapolis; Louis H. Clerf, Philadelphia; Kenneth M. Day, Pittsburg; Thomas C. Galloway, Chicago; James H. Maxwell, Ann Arbor, Mich.; Arthur W. Proetz, St. Louis; and Harry P. Schenck, Philadelphia. Among the ophthalmologists who will lecture are Drs. S. Judd Beach, Portland, Me.; William L. Benedict, Rochester, Minn.; Daniel B. Kirby, New York; Peter C. Kronfeld, Chicago; and Dohrmann K. Pischel, San Francisco.

The Midwinter Seminar follows immediately the Pan-American Congress of Ophthalmology, which will be held in Havana, Cuba, January 5-10, 1948. The dates chosen for the two meetings make possible a delightful opportunity to attend both and at the same time enjoy a winter vacation amid unsurpassed resort attractions.

## MICHIGAN POSTGRADUATE CLINICAL INSTITUTE

The Second Annual Michigan Postgraduate Clinical Institute will be held at the Book-Cadillac Hotel, Detroit, March 10-12, 1948. Forty-nine outstanding clinicians and lecturers will present a concentrated three-day postgraduate course covering the newest developments in medicine, surgery, obstetrics, pediatrics, dermatology, ophthalmology, otolaryngology, and general practice.

All members of the American Medical Association and of the Canadian Medical Association are cordially invited to attend. There is no registration fee.

## RESIDENCY TRAINING PROGRAM IN PSYCHIATRY

Dr. Harold W. Sterling, Manager of the Veterans Administration Hospital, North Little Rock, Arkansas, announces that the first residency training program in psychiatry in the state of Arkansas has been formally approved by the American Medical Association and the American Board of Psychiatry and Neurology. The American Medical Association has approved this hospital for fifteen residents for a three-year training period.

Residents will be accepted for training on July 1 and January 1 of each year with an annual stipend of $3,300 for physicians who served as medical officers during World War II and an annual stipend of $900 to $1,800, plus subsistence, for others.

## Society for the Prevention of Asphyxial Death, Inc.

For many years Dr. Chevalier Jackson has urged that all physicians become familiar with the "death zone of the respiratory tract." For the last fifteen years the Society for the Prevention of Asphyxial Death, Inc., has labored to make the physician "asphyxia conscious." Since April of this year, classes in laryngoscopy and intubation have been given at the Manhattan General Hospital in cooperation with the S.P.A.D., Inc. Other courses are planned for the New York Eye and Ear Infirmary.

The purpose of the course is clear-cut; it is to save lives now lost during anesthesia and other forms of acute asphyxial accidents. Classes are limited to twelve students. Courses will be given Nov. 21 and 22, Dec. 5 and 6, and Jan. 2 and 3 in New York City; Jan. 14 and 15 in Los Angeles; Jan. 21 and 22 in Honolulu, Hawaii; Feb. 6 and 7, March 5 and 6, and April 2 and 3 in New York City. For information address Pneumatology, Manhattan General Hospital, 307 Second Avenue, New York City.

## Mississippi Valley Medical Society 1948 Essay Contest

The Eighth Annual Essay Contest of the Mississippi Valley Medical Society will be held in 1948. The Society will offer a cash prize of $100.00, a gold medal, and a certificate of award for the best unpublished essay on any subject of general medical interest (including medical economics and education) and practical value to the general practitioner of medicine. Certificates of merit may also be granted to the physicians whose essays are rated second and third best. Contestants must be members of the American Medical Association who are residents of the United States. The winner will be invited to present his contribution before the Thirteenth Annual Meeting of the Mississippi Valley Medical Society to be held in Springfield, Ill., Sept. 29, 30, Oct. 1, 1948, the Society reserving the exclusive right to publish the essay in its official publication—the **Mississippi Valley Medical Journal** (incorporating the **Radiologic Review**). All contributions shall be typewritten in English in manuscript form, submitted in five copies, not to exceed 5000 words, and must be received not later than May 1, 1948. The winning essay in the 1947 contest appears in the January 1948 issue of the **Mississippi Valley Medical Journal** (Quincy, Illinois).

Further details may be secured from Harold Swanberg, M.D., Secretary, Mississippi Valley Medical Society, 209-224 W. C. U. Building, Quincy, Illinois.

## Manuscript Service, Inc.

Manuscript Service, Inc., 6432 Cass Avenue, Detroit 2, Michigan, is "an organization devoted to ethical editorial service in the field of medicine and allied sciences." It is intended to provide editorial assistance for authors who do not have adequate library facilities available, or whose time is limited. Officers are Ralph E. Sloan, president; Howard P. Sloan, M.D., vice president; and Edward S. Wunsch, secretary.

## Dr. W. W. Bauer Honored

The Elisabeth Severance Prentiss National Award in Health Education for 1947 was presented to Dr. W. W. Bauer, director of the A.M.A.'s Bureau of Health Education, at the seventh anniversary civic luncheon of the Cleveland Health Museum, held on November 17.

## British Medical Publications

All periodical publications of the British Medical Association are now obtainable through Grune & Stratton, Medical Publishers, 381 Fourth Avenue, New York 16, New York, who have been appointed by the Association sole agents for the United States beginning with January, 1948.

The journals are:

**British Medical Journal**, published weekly—$14 a year

**Abstracts of World Medicine**, published monthly—$13 a year

**Abstracts of World Surgery, Obstetrics and Gynecology**, published monthly—$9 a year

Quarterly journals: uniform subscription rate—$5.50 a year

**Annals of the Rheumatic Diseases**
**Archives of Disease in Childhood**
**British Heart Journal**
**British Journal of Industrial Medicine**
**British Journal of Pharmacology and Chemotherapy**
**British Journal of Social Medicine**
**British Journal of Venereal Diseases**
**Journal of Clinical Pathology**
**Journal of Neurology, Neurosurgery, and Psychiatry**
**Thorax**

### Diagnostic Anti-Rh Serum

The development by Dr. Philip Levine, one of the world's outstanding serologists, of a highly accurate diagnostic anti-Rh (anti-D) serum derived from human blood has been announced by the Ortho Pharmaceutical Corporation of Raritan, N. J.—the first of the pharmaceutical houses to offer this type of serum for determining whether an individual has Rh-negative or Rh-positive blood. It is now available for use by hospital and clinical laboratories to prevent intragroup transfusion accidents and for the selection of Rh-negative blood for the affected infants of Rh-negative mothers.

SITUATION WANTED

**Veterinarian, aged 30, desires position as full- or part-time veterinarian with city-county health unit. Fully experienced.**

Address "V"
**Post Office Box 456**
**Winston-Salem, N. C.**

# AUXILIARY

## CHRISTMAS GREETINGS TO ALL AUXILIARY MEMBERS EVERYWHERE

Dear Members,

In the words of Tiny Tim, "God bless us every one." Last May there were a thousand and four of us. We welcome the new auxiliaries organized this fall. They are: Gaston, Mitchell-Yancey, and Moore. We will look forward to seeing representatives from these groups, along with several groups that are to organize soon, at our May meeting.

Even as we say "Merry Christmas," we say "Happy New Year." Let us get necessary routine Auxiliary business done early in the new year and be ready for our twenty-fifth anniversary meeting in May.

At Christmastide we like especially to remember the guests who occupy our Auxiliary beds in each of the state sanatoria. Those of you who do not have the name of the guest in your sanatorium district may secure it from the Bed Chairman.

> Mrs. G. M. Billings, Morganton, is chairman of the Stevens Bed at the Western Sanatorium at Black Mountain.
>
> Mrs. William Richardson, Chapel Hill, is chairman of the McCain Bed at Sanatorium.
>
> Mrs. M. I. Fleming, Rocky Mount, is chairman of the Cooper Bed at the Eastern Sanatorium at Wilson.

Speaking of Christmas presents, how about giving your school library or your favorite beauty shop a subscription to *Hygeia?* Mrs. Taylor Vernon, *Hygeia* Chairman, Morganton, will take care of it for you and will send half of the subscription price to the Sanatorium Bed Fund.

May the holiday season bring you and all our medical families great joy and peace and hope for better things to come.

NORMA BERRYHILL, *President*
(Mrs. W. Reece Berryhill)
Chapel Hill

## RECENT NON-TECHNICAL BOOKS OF INTEREST TO DOCTORS AND THEIR FAMILIES

Reviewed by
**Mrs. N. B. Adams, Library Extension Department,**
University of North Carolina, Chapel Hill

**The Doctor's Job.** By C. A. L. Binger, M.D. Norton, 1945. $3.00. Winner of the 1945 Norton Medical Award. A comprehensive and companionable book, enlightening to patients, valuably suggestive to physicians, and absorbing to the general reader.

**Drums of Destiny.** By Peter Bourne. Putnam's, 1947. $3.00 A young London-trained physician is the hero of this exciting historical novel of Haiti in the time of Toussaint l'Ouverture.

**Autobiography of a Chinese Woman.** By Pu Wei Chao. Day, 1947. $3.75. The author is a physician and a housewife. She has been principal of a school, doctor, and traveler. She received her medical education in Japan, and established a hospital for women in China. Her book is interesting, brings new light on China, and helps to build international friendliness.

**Treasury of Doctor Stories by the World's Great Authors.** Edited by Fabricant and Werner. Fell, 1946. $3.00. A collection of 35 stories, essays, or excerpts from novels. An anthology that makes sense in an unusual and significant way, in that the arts of healing and of literature are peculiarly and effectively compounded.

**Science Advances.** By J. B. S. Haldane. Macmillan, 1947. $3.00. Important essays by the British scientist who did research for the British government during the recent war on effects of high pressure on human physiology. These eighty essays cover such topics as temperature, blood, evolution, fatigue, colds, cancer, and x-rays.

**Doctors East, Doctors West: An American Physician's Life in China.** By Edward H. Hume, M.D. Norton, 1946. $3.00. Entertaining and enlightening medical autobiography.

**Harvey Cushing; The Story of a Great Medical Pioneer.** By John F. Fulton. Thomas, 1946. $5.00. A genuinely great biography, rich in many excerpts from Cushing's letters and journals. Important reading.

**My Polio Past.** By Noreen Linduska. Pellegrini and Cudahy, 1947. $2.75. Autobiography of a young girl who recovered from polio. Courageous and gay and full of encouragement for others.

**Modern Woman, The Lost Sex.** By Ferdinand Lundberg and Dr. Marynia Farmer. Harper, 1947. $3.50. Discusses in an urbane and even at times witty style the changed conditions, modes of behavior, moral codes, which have brought about the personal problems which modern woman is unable to resolve. Based on clinical facts, and written from a psychoanalytical point of view, the book is much broader in sociological implications than the title would indicate.

**White House Physician.** By Ross T. McIntire, M.D. Putnam, 1946. $3.00. The author was personal physician to Franklin D. Roosevelt for twelve years. He offers here an interpretation of Roosevelt's plans and actions according to the physical, spiritual, and mental vigor of his famous patient.

**Selected Writings of Benjamin Rush.** Edited by Dagobert D. Runes. Philosophical Library, 1947. $5.00. This collection of excerpts from Dr. Rush's writings offers a good introduction to the personality and works of this professor of medicine in the University of Pennsylvania, and one of the leaders of the American Revolution.

**The Development of Modern Medicine.** By Richard Harrison Shyrock. Knopf, 1947. $5.00. Professor Shyrock delineates medicine not as an isolated discipline, but as a living force, molded by scientific, philosophic, and social thought. He is a profound scholar, with encyclopedic knowledge, and rare power of critical selection.

**The Golden Isle.** By Frank G. Slaughter, M.D. Doubleday, 1947. $3.00. The author of this historical novel is himself a doctor, and his hero is a brilliant surgeon. The setting for this exciting and colorful romance is Spanish Florida in the early days of the nineteenth century.

**With Cradle and Clock.** By K. Stowman. Harper, 1946. $2.50. New York City in 1702 furnishes the background for this story of an English doctor who fought an uphill battle for the right to be a "male midwife," as early obstetricians were called. Historical novel based on facts.

**New Worlds in Medicine.** Edited by Harold Ward. McBride, 1946. $5.00. An anthology for the layman. Medicine in war, the value of blood and plasma transfusions, advances in pathology, the use of radiotherapy, heredity, psychiatry, neurology, are only a few of the subjects covered. A satisfactory sequel to previous anthologies that include the more classic episodes in medicine.

**Petticoat Surgeon.** By Bertha Van Hoosen, M.D. Pellegrini and Cudahy, 1947. $3.75. Autobiography of the first woman to be appointed head of a department of obstetrics. Among medical autobiographies it belongs in the first rank, for style, vigor of expression, humor, and humanity.

## In Memoriam

### Frank A. Sharpe, M.D.

In the passing of Dr. Frank A. Sharpe, North Carolina lost one of its most brilliant, popular, and beloved physicians. Death, coming quietly during his sleep, terminated a highly successful career at a time when he was rendering distinguished service as president of the Medical Society of the State of North Carolina.

Born near Greensboro on September 27, 1889, of sturdy pioneer Scotch-Irish ancestry, Dr. Sharpe spent his early boyhood in and around Guilford County. He received his academic degree from Davidson College in 1910, and after a year in business he entered the Medical School of the University of Pennsylvania and received his degree in medicine there in 1916. During his internship at Lennox Hill Hospital in New York, he volunteered for service during World War I. He served at the General Hospital, Fort Riley, Kansas, the Mayo Clinic, and finally at the Walter Reed General Hospital. He was discharged from service in 1919.

Dr. Sharpe came to Greensboro in 1919 and began the practice of medicine. He was successful from the start and soon limited his practice to obstetrics and gynecology. In spite of a large and busy practice, he found time to give freely of his talents to various civic and religious activities of his city. He was a Rotarian, a Mason, and a Legionnaire. He was a member of the Sons of the American Revolution, and for seven years—from 1940 to 1947—was a deacon in the First Presbyterian Church of Greensboro.

Dr. Sharpe served one term as president of the Guilford County Medical Society. Other medical organizations in which he was extremely active were the North Carolina Obstetrical Society, the South Atlantic Association of Obstetricians and Gynecologists and the Tri-State Medical Society. Dr. Sharpe was a fellow of the American College of Surgeons. From 1941 to 1945 he was a member of the Board of Health of the City of Greensboro, and for six years was a member of the Board of Medical Examiners of the State of North Carolina. At Pinehurst in 1946 he was made president-elect of the Medical Society of the State of North Carolina, and succeeded to the office of president in May, 1947. At the time of his death Dr. Sharpe was busily engaged in the affairs of the State Society and had already traveled widely throughout the state in its interests.

This resume of Dr. Frank Sharpe's career fails to give adequate information regarding the man himself, his methods, his personality, and his character. Dr. Sharpe enjoyed for thirty-one years a full life of honorable and active practice in medicine, taking the newest developments of medicine in his stride and keeping abreast of the changing trends and methods. He was a real Southern gentleman of the old school.

Dr. Sharpe was richly endowed with the real things in medicine. He had a fine intellect, combined with common sense, which kept him clear-headed in the midst of fact and fancy. He possessed in abundance refinement, poise, accuracy, and resourcefulness, which, coupled with kindly understanding, made him a well rounded medical man. Right-thinking and truth-loving were innate in his make-up. His patients, friends, and associates came from all strata of society, and it can truthfully be said that he could "walk with Kings—nor lose the common touch."

North Carolina can ill afford to lose such a genial physician.

BROCKTON R. LYON, M.D.

**Psychoneurosis: disease or defection?**—That the disease, psychoneurosis, contains ethical defections, which may be conscious or unconscious, the results of habit or example, appears patently obvious to the nonpsychiatric observer. These observers are prone to judge solely in terms of ethics, having little knowledge of the impact of a man's past on his present and future. On the other hand, they appear to have an insight which psychiatry, in its introspection, seems to have lost in a jungle of descriptive words and phrases, an insight into the moral fibre of men at war.—Alexander R. MacLean: "No Disease," Canad. M. Assoc. J. 56:323 (March) 1947.

# BOOK REVIEWS

**Advances in Internal Medicine**, Volume 2. Edited by William Dock, M.D., Long Island College of Medicine, and I. Snapper, M.D. The Mount Sinai Hospital, New York. 642 pages. Price, $9.50. New York: Interscience Publishers, Inc., 1947.

The editors state that the purpose of the series to which this volume belongs is to brief the specialist and the general practitioner "on outstanding recent advances in internal medicine and related fields." This volume attains this purpose by presenting complete and concise surveys of thirteen subjects in which our knowledge has recently been considerably advanced. The articles presented are written in monograph form and bring the subjects treated up to date in a uniformly competent manner.

The subjects discussed include the latest developments in the use of penicillin, the surgical treatment of hypertension, pernicious anemia, thoracic surgery, interpretation of the ventricular complex of the electrocardiogram, recent studies on circulatory failure by means of venous catheterization, angiography and angiocardiography, the Rh antigen, nutritional problems, and the development of new insecticides for the control of insect-borne diseases. Each article is written by one or more recognized authorities in the field covered.

The bibliographic references to recent papers are extensive, and the contents of the papers are evaluated and assigned to their relative positions in the complete picture by the authors. Tables, charts, and illustrations are used freely.

The book is recommended to internists, general practitioners and students.

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**Internal Medicine in General Practice.** By Robert Pratt McCombs, M.D., F.A.C.P., Assistant Professor of Medicine and Director of Postgraduate Teaching, Tufts College Medical School; Senior Attending Physician, The Joseph H. Pratt Diagnostic Hospital; Diplomate of the American Board of Internal Medicine. Ed. 2. 741 pages with 122 illustrations. Price, $8.00. Philadelphia and London: W. B. Saunders Company, 1947.

The fact that a second edition of this book was called for within four years must mean that it has a place for itself. In the preface, the author states that "controversial material . . . diseases encountered but rarely in the United States, and . . . technical procedures . . . usually considered to lie solely within the province of specialists have been strictly condensed or omitted entirely . . . Special emphasis has been placed upon those diseases in which errors in diagnosis and therapy commonly occur."

It is difficult to cover adequately, in one volume, the entire field of internal medicine; indeed, it is impossible to do more than give a comparatively brief description of the more common diseases. This the author does admirably, for the most part. In the effort to compress his material, however, he has made some of the descriptions rather skimpy. For example, influenza—which since 1918 has constituted the major part of the general practitioner's work—is dismissed with two pages; the most characteristic single finding, pharyngitis, is not mentioned; and the very questionable statement is made that "In nearly one half of the cases slight pneumonitis may be present."

A weakness of this type of book is that the experienced practitioner is already familiar with the diseases commonly encountered, and is more in need of information about the less common conditions.

It is much easier to criticise than to write such a book, however; and the impression left by it is generally favorable. The one hundred and twenty-two illustrations add much to its value. Some of them are excellent—especially the colored plates of the lesions produced by vitamin deficiencies, of some other skin conditions, of the eyegrounds, and of certain blood dyscrasias.

The book can be recommended to all who want a review of modern medical diagnosis and treatment, written in a clear, easily understood style.

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**Laboratory Manual of Microbiology for Nurses.** By Elizabeth Gill, B.S., R.N., and James T. Culbertson, Ph.D. 116 pages. Price, $1.50. New York: G. P. Putnam's Sons 1947.

The authors have provided a much needed set of laboratory directions suitable for nurses. Fundamental principles of laboratory work are discussed, and laboratory exercises having to do with care of the microscope, staining of bacteria, preparation and inoculation of culture media, and cultivation and study of bacteria obtained from the environment and the healthy body are given. These principles are then applied in the study of sterilization, disinfection, antisepsis, and specific genera of important bacteria such as staphylococci and streptococci. The last pages of the manual are devoted to a brief discussion of protozoa, helminths, and arthropods. Two appendixes contain valuable information relating to reagents, solutions, and sources of materials.

The authors state in the preface that "the student deserves laboratory instruction in the proper methods of handling pathogenic microorganisms." No truer words could be spoken, but all too frequently such instructions are not carried out in the nurses' training program.

All in all, this manual is strongly recommended for the purpose for which it was written.

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**The basis for the concerted Scandinavian mass BCG vaccination** is the importance tuberculosis plays even today as an endemic disease—the commonest chronic disease in people between 15 and 30 years. Approximately 50 per cent of this age group do not react to tuberculin. These non-reactors have proved more susceptible to progressive tuberculous disease when infected than those in whom a postive tuberculin reaction indicates a previous infection.—Konrad Birkhaug, M.D., Am. Rev. Tbc., Mar., 1947.

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### KEY TO ABBREVIATIONS

Aux—Auxiliary
C—Correspondence
CPC—Clinicopathologic Conference
Ed—Editorial
In Mem—In Memoriam
ML—Medicolegal Abstract
MW—Maternal Welfare Committee
PM—President's Message
PsyC—Psychosomatic Conference
TS—Thumbnail Sketch

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